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PAUL E. POLZIN

Why Missoula Grew: The University and the Wood Products Industry

An analysis of population, retail sales, and income in the Missoula area

The Montana Economic Study identified the western counties of Montana as the fastest growing region in the state.[1] Missoula has long been recognized as the focal point of this eight-county area and is, in many ways, a statewide leader in economic growth. The *1970 Census of Population* reports that the population of Missoula County totaled 58,263 during the first part of April 1970. This represents an increase of 30 percent (the largest for any county in the state) over the 1960 figure of 44,663 and 64 percent above the 1950 estimate of 35,493.[2] Arguments over what is responsible for population growth and the corresponding economic growth can be heard in beerhalls, barbershops, and koffee-klatches, but no one has ever made a statistical inquiry that attempts to answer the question. This article does not attempt to provide all the answers, but it does test the comparative contributions to the Missoula economy of the University and the wood products manufacturing industry.

Census estimates represent the long-run point of view; they show the overall population growth of Missoula between 1950 and 1970. They do not, however, portray the ebb and flow of economic activity which occurs from one year to the next. This study goes behind the long-run trends and uses annual data to examine the short-run developments in Missoula's economy. Series representing the year-to-year economic activity in Missoula County will be presented and then analyzed to isolate the major causes leading to change.

Most economic indicators, such as population and income, move together over long periods and may be used more or less interchangeably to study the overall economic performance of a region. But, in the short run, they may diverge and we must be very careful to delineate exactly what is meant by economic growth. For example, when comparing one decade to another, analysis of either population or income data would yield approximately the same conclusions; in specific years, however, these two magnitudes may display different trends and we would have to decide which was most relevant to the problem at hand.

Table 1 lists annual estimates for a variety of economic indicators of Missoula County. These include population, disposable income (income after taxes) of residents, and total sales in retail trade.[3] Each represents a slightly different aspect of economic growth and, depending on one's point of view, one or another may be more im-

[1] *Research Report of the Montana Economic Study*, pt. 1, vol. 1, chap. 1 (Missoula: Bureau of Business and Economic Research, University of Montana, 1970), p. 1.26.

[2] U.S. Department of Commerce, Bureau of the Census, *U.S. Census of Population: 1970, Number of Inhabitants, Montana*, PC(1)-A28 (Washington, D.C.: U.S. Government Printing Office, 1970), table 9, p. 28-12; *idem., U.S. Census of Population: 1960, Number of Inhabitants, Montana*, PC(1)-28A (Washington, D.C.: U.S. Government Printing Office, 1960), table 6, p. 28-11.

[3] The population estimates are annual averages and may differ slightly from the April 1 figure reported in the *Census of Population*.

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Table 1

Selected Economic Indicators for Missoula County 1950-1970

Year	Disposable Income (in 1958 Dollars)	Retail Sales (in 1958 Dollars)	Population	Manufacturing Employment	University Enrollment
1950	67,802,000	44,718,000	33,400	1,991	3,027
1951	72,884,000	43,691,000	35,900	2,078	2,485
1952	68,966,000	45,769,000	36,200	2,099	2,167
1953	66,193,000	45,150,000	36,700	2,142	2,093
1954	66,932,000	48,041,000	37,700	2,216	2,214
1955	70,540,000	55,236,000	39,900	2,448	2,559
1956	73,178,000	53,926,000	41,400	2,601	2,802
1957	72,205,000	51,867,000	41,600	2,495	2,743
1958	73,080,000	53,390,000	43,000	2,457	2,983
1959	77,045,000	64,855,000	44,400	3,298	2,507
1960	83,154,000	65,178,000	45,200	2,630	3,423
1961	87,352,000	64,218,000	45,800	2,878	3,733
1962	86,274,000	68,332,000	46,600	3,051	4,029
1963	96,402,000	71,856,000	47,300	3,249	4,290
1964	98,895,000	75,983,000	48,000	3,375	4,724
1965	104,131,000	80,835,000	48,800	3,372	5,348
1966	110,947,000	87,827,000	49,100	3,293	5,643
1967	114,920,000	84,095,000	49,400	3,324	5,844
1968	119,299,000	85,750,000	51,400	3,459	6,345
1969	123,308,000	94,748,000	54,200	3,470	7,164
1970	124,825,000	91,750,000	56,400	3,351	7,763

Sources: [Income, retail trade, and population] "Survey of Buying Power," 1950-1970 Supplements to *Sales Management*.

[Employment] Derived from "Industrial Wages, Wage Earners, Employers by Counties and Industries," Fiscal Years 1950-1971, *Montana Labor Market*, Supplement FL295 (Helena, Montana).

[Enrollment] Registrar, University of Montana, unpublished data (Missoula, Montana).

Notes: Population, employment, and enrollment data are annual averages. Employment data are adjusted to a calendar-year basis.

portant. The elected official may be concerned with increasing demands for public facilities, which are closely related to the growth of population. The businessman, on the other hand, is interested in the future of his firm and may carefully watch the trends in the income of residents, which is related to their welfare and desire to spend, or the performance of total sales in retail trade—how the residents actually spend their income.

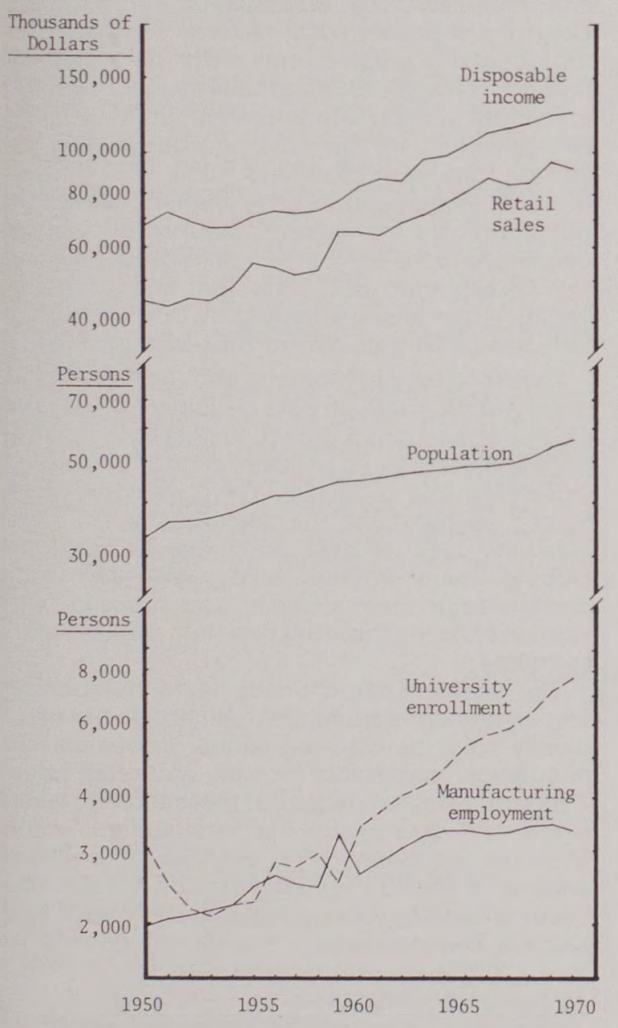
The yearly data on disposable income, retail sales, and population for Missoula County are also presented graphically in the upper portion of figure 1. The estimates for disposable income and total sales in retail trade are given in constant 1958 dollars to remove distraction by inflation. The general upward trend in all three series confirms the underlying growth illustrated by the Census data. However, the rates of growth change from year to year. (The graphs are plotted on a semilog scale so that equal slopes denote equal rates of growth.) Also, because population, disposable income, and retail sales represent slightly different aspects of economic growth, the yearly changes in one series are not always reflected in the others.

The trend in population shows the least vacillation. With the exception of a minor slowdown in the early fifties and a marked acceleration in 1969 and 1970, Missoula's growth rate has remained remarkably constant. On the other hand, the growth rates of retail sales and disposable income show marked year-to-year changes. For example, extremely fast growth in retail trade between 1953 and 1955 was followed by actual declines from 1955 to 1957 and the rate of growth of disposable income shrank in 1963 after a robust year during 1962.

The annual data on population, disposable income, and sales do not tell us all we want to know;

FIGURE 1

Selected Economic Indicators
for Missoula County
1950-1970



Source: Derived from data in table 1.

they do not reveal the underlying causes of growth. In other words, these data tell us *what* happened but do not give us a hint as to *why* it happened. The Montana Economic Study divided industries into "primary" and "derivative" categories.[4] Primary industries are felt to be the "primary" cause of economic growth because the changes in them are due to factors originating outside the area under study. For example, an automobile factory may increase production to supply an increased national demand for autos. The "derivative" industries, such as services and retail trade, would then respond as the factory workers and their employers spent their increased incomes in the local area.

The Montana Economic Study identified increases in manufacturing activity, especially the lumber and wood products industry, as one of the prime causes for the growth of Western Montana.[5] A cursory examination of the Missoula area, with its many mills and factories, confirms the notion that this industry also plays a crucial role in this county's economy. Unfortunately, no annual data available accurately reflect the developments in Missoula's lumber and wood products industry. Yearly data on total manufacturing employment in Missoula County, available from the Employment Security Commission of Montana and table 2 (taken from the *1970 Census of Population*) show that lumber and wood

Table 2

Manufacturing Employment, by Industry Group
Missoula County, 1970

Industry Group	Employment
Manufacturing, total	2,588
Furniture and lumber and wood products	1,429
Metal industries	35
Machinery, except electrical	56
Electrical machinery, equipment, and supplies	---
Transportation equipment	25
Other durable goods	238
Food and kindred products	159
Textiles and fabricated textile products	46
Printing, publishing, and allied industries	223
Chemicals and allied products	9
Other nondurable goods (including not specified manufacturing industries)†	368

Source: U.S. Department of Commerce, U.S. Bureau of the Census, *U.S. Census of Population: 1970, General Social and Economic Characteristics, Montana*, Final Report PC(1)-C28 (Washington, D.C.: U.S. Government Printing Office, 1971), table 123, p. 28-218.

Note: The employment data are for persons 16 years of age and over.

†Includes paper and allied products. These employment estimates are based on a Census Bureau sample of the population, which in this case underpresented the true employment in the paper and allied products industry by at least 100 workers.

[4]*Montana Economic Study*, pt. 1, vol. 2, chap. 2, p. 2.15.

[5]*Montana Economic Study*, pt. 1, vol. 3, chaps. 5-8, p. 5,11.

products and other nondurable goods such as paper and allied products constitute the bulk of employment in manufacturing. However, these estimates of total manufacturing employment do not include the self-employed, who are not covered by unemployment insurance. Nor does the manufacturing sector include all persons concerned with lumber production; some, such as Forest Service personnel, are classified in a different industry. Nevertheless, it is not unreasonable to suppose that all the unreported aspects of the lumber industry change in about the same manner and at approximately the same time as employment covered by unemployment insurance. Consequently, we feel total manufacturing employment can be used as a proxy for the overall activity in the wood products industry even though it is not a perfect measure.

The University of Montana, located in Missoula, provides another source of economic growth.[6] The institution has grown from a gross enrollment of 3,027 students in 1950 to 7,763 students in 1970 (table 1). The University influences the local economy in a number of ways. First of all, the faculty and staff live in Missoula and spend a large portion of their wages and salaries in the local area. Secondly, the students spend considerable sums in the establishments of local merchants. For those living off campus, this includes rent, food, clothing, and all other expenditures necessary to maintain an adequate standard of living. Students living in dormitories go into Missoula for recreation and to purchase those commodities not available on campus. Finally, the University contracts with local firms to provide such large-scale items as food service supplies, clerical and office supplies and utilities.

An accurate measure of all University operations is not available on a year-by-year basis. However, it would not be illogical to presume that the total stimulus provided by this institution is proportional to the number of students. That is, changes in wages of faculty and staff, student expenditures, and contracted services are tightly related to the number of students. Consequently, annual estimates of student enrollment will be used as a proxy for the total effect of the University of Montana on the Missoula economy.

The comparative figures on student enrollment and manufacturing employment for Missoula County are presented in table 1. They are also reproduced in graphic form in the lower panel of figure 1. Between 1950 and 1964 the general trend in manufacturing (with the exception of 1956-58) was upward, with the most vigorous growth occurring between 1958 and 1963. Since 1964, however, manufacturing employment has shown no significant increases.[7] Student enrollment decreased in the early fifties, possibly because of the Korean War. But, since that time, the University experienced steady growth with particularly robust periods during 1962-65 and 1969-70.

The University of Montana and the lumber and wood products industry are certainly not the only causes of economic growth in Missoula. A complete analysis should consider such factors as the increasing role of Missoula as a regional trade center, tourism, and the amenities of the area. However, lack of data precludes us from including them in this study. We can only acknowledge their absence and proceed with caution knowing that our analysis is somewhat incomplete.

The year-to-year changes in manufacturing employment and student enrollment do not completely coincide with the annual movements in population, disposable income, and retail sales. This suggests that neither of these factors, taken singly, entirely explains the developments in the Missoula economy. For example, the sharp decline in student enrollment during 1950 was accompanied by sizable increases in disposable income and population. Nor is the decline in

[6]The University is unlike manufacturing in that it does not produce a physical product which is marketed outside the area. However, the University is definitely not a derivative industry because its activity is not primarily determined by events occurring in Missoula. Although the state legislature allocates the public funds spent, most of the students come from outside the local area and receive at least a portion of their income from home.

[7]Discussion of developments in the lumber industry and the reasons for the slowdown of employment growth may be found in the following: Paul Polzin, *Employment Trends in Montana, 1950-1968*, a Staff Study of the Montana Economic Study; and *Montana Economic Study*, pt. 2, vol. 2, chaps. 3-4. It may be argued that manufacturing employment does not reflect the true impact of this industry after 1964. For, even though the number employed did not increase after this date, they continued to receive higher wages and, thus, may still exert a growing influence on the economy. To investigate this possibility, total wages in manufacturing, expressed in constant 1958 dollars, was graphed and all the following statistical analyses were performed using wages rather than employment. This cross check did not result in any significant changes in the conclusions.

manufacturing employment in 1967 reflected in population, disposable income, and retail trade figures for that year—all of which experienced significant growth.

A closer examination of figure 1 suggests that both the University and manufacturing strongly influence the growth of Missoula but that the impact of a change in one has frequently been tempered by simultaneous developments in the other. For example, the moderate increases in population, disposable income, and retail sales in 1956 could be the net result of the positive stimulus provided by the increase in students and by the retarding effect of the slight decrease in manufacturing employment. In 1957, when both student enrollment and manufacturing employment registered significant growth, all three indicators of economic activity increased at a much faster rate.

The graphic presentation of the data in figure 1 does not allow us to separate and examine the influences of the University and manufacturing employment on Missoula's economy. However, a statistical procedure called regression analysis allows us to distinguish and estimate the separate effects of these two factors. Essentially, regression analysis assumes that cause and effect relationships may be represented by an equation of the following form:

$$(1)\ Z = a + bM + cS$$

where, M is manufacturing employment, S is student enrollment, Z may be population, disposable income, or retail sales. The regression procedure uses the annual data presented in table 1 to estimate b and c, which summarize the effect of M and S on Z. Table 3 presents a number of estimates of b and c, obtained by repeating this procedure using all three indicators in place of Z, each of which reflects the effect of a one-unit increase in manufacturing employment or student enrollment on population, disposable income, or retail sales.[8]

The upper panel of table 3 presents the findings when population is substituted for Z and illustrates the influence of manufacturing and the University on population. Between 1950 and 1970 an increase of one student, on the average,

[8]Only a summary of the statistical findings and their implications are presented in this paper. A complete report of the regression results is available, upon request, from the author.

Table 3

Effect of a One-Unit Change in Student Enrollment and Manufacturing Employment in Missoula County 1950-1970

	1950-1970°	1950-1960	1960-1970
Population			
One additional student changed population by:	1.47	1.28	2.66
One additional manufacturing employee changed population by:	6.96	14.30	-1.81†
Retail sales (in 1958 dollars)			
One additional student changed retail sales by:	5,289	6,664	6,189
One additional manufacturing employee changed retail sales by:	15,451	20,575	7,663
Disposable income (in 1958 dollars)			
One additional student changed disposable income by:	9,208	6,329	9,119
One additional manufacturing employee changed disposable income by:	9,216	7,991	9,637

Source: Derived from data in table 1.

°Because of the mathematical properties of regression analysis, the 1950-1970 estimates are not a simple average of the 1950-1960 and 1960-1970 estimates.

†As explained in the text, this number will be interpreted as being equal to zero.

stimulated an increase in population by 1.47 people.[9] On the other hand, the addition of one manufacturing employee resulted in a total growth of 6.96 people in Missoula County.[10] For comparison purposes, separate estimates were made for both the 1950-60 and 1960-70 periods. During the first decade each additional student increased the population by 1.28 people while the corresponding estimate for employment was 14.30. From 1960 to 1970 the impact of a change in students increased to 2.66. But during that same period, the estimated value for manufacturing is −1.81—implying the implausible situation that an increase of one employee actually resulted in a decrease in population. However, close examination of the statistical results reveals that there is a good chance that this number is a statistical accident and its true value is zero.[11] At any rate, during the sixties manufacturing was not a significant cause of growth in population.

The middle panel of table 3 examines the effect of student enrollment and manufacturing employment on retail sales. Over the entire twenty-year period, an increase of one student or manufacturing worker, on the average, increased retail trade (in 1958 dollars) by $5,289 and $15,451, respectively. During the fifties the impact of each additional student was $6,664 while the impact of one additional employee was $20,575. However, during the latter decade, the estimate for students fell slightly to $6,189 while that of manufacturing employment dropped from $20,575 to $7,663, a fall of almost two-thirds.

The impact of one additional student or manufacturing worker on disposable income was, according to the lower section of table 3, approximately equal. The average for the 1950-70 period was $9,208 for the former and $9,216 for the latter. Between 1950 and 1960, an increase of one student resulted in $6,329 additional income while the corresponding estimate for manufacturing workers was $7,991. During the sixties, the effect of a change in students increased to $9,119 and that for manufacturing to $9,637.

A number of conclusions can be drawn from table 3. First of all, a one-unit change in student enrollment had, in all but one case, a smaller impact on population, retail trade, and disposable income than an equal change in manufacturing employment. This should be expected because an increase of one manufacturing job is more likely to mean that a worker and his family moves into the area—with their associated demands for goods and services. Students, on the other hand, are mostly single and one expects that a student's total expenditures for goods and services are lower that those of a family.

There appears to be a pronounced difference between the fifties and sixties in the impact of a one-unit change in manufacturing workers. With respect to retail trade and population, the effect of an increase of one manufacturing job was much greater between 1950 and 1960 than during the latter decade.[12] (The impact of student enrollment also changed between decades, but to a much smaller extent.) Before 1960, an increase of one manufacturing worker increased population by 14.30 people and retail sales by $20,575. But after this date, one manufacturing job produced practically no change in population and only a $7,663 increment in retail trade.[13] We can only speculate as to the reason for this variation. One explanation which would be consistent with these findings is that during the fifties the manufacturing positions were filled by men who moved to Missoula and brought their families with them; then during the sixties, the new openings were filled to a greater extent by working wives of people already residing in Missoula —which would result in each new manufacturing

[9]These estimates are accurate only for small changes in the number of students or manufacturing employees and would not be valid for estimating the impact of a doubling of student enrollment or the closure of all manufacturing plants.

[10]These statements should not be interpreted as saying that the University and manufacturing were the *only* causes of changes in population. Other factors, such as the growth of Missoula as a regional trade center, undoubtedly resulted in some population growth. Statistically, this is reflected by the fact that student enrollment and manufacturing employment "explained" 92 percent of the variation in population leaving 8 percent to be attributed to sources not explicitly considered.

[11]Regression analysis not only estimates the effect of students and manufacturing employment on population but also provides a procedure for evaluating the accuracy of the values obtained. In this case, the estimated value of the impact of manufacturing employment may be quite inaccurate and, because it is implausible, may be dismissed.

[12]There was a slight increase between periods in the impact of manufacturing employment on disposable income. However, this change is of a much smaller magnitude than those associated with population and retail trade and may be a statistical accident.

[13]The −1.81 estimate for the effect of manufacturing employment on population during the sixties is probably a statistical accident and should be considered as zero.

position being associated with a smaller increase in population and retail trade.[14]

The effect of one additional student or manufacturing worker is significant but does not constitute the impact of the entire University and manufacturing sector on the Missoula economy. To compute the total impact we multiply the effect of a one-unit increment by the average change in enrollment or employment. Using population as an example and referring to table 4, we see that an increase of one student between 1950 and 1960 resulted in population growing by 1.28 people. On the average, during this decade, student enrollment increased by 36 students per year (a figure which may seem startlingly small but in that decade several years showed a drop in enrollment). Consequently, the average annual impact of the University on population during the fifties was 46 people per year. On the other hand, a change of one manufacturing worker increased population by 14.30 people and, on the average, employment increased by 58 workers a year. Thus, the average annual impact of manufacturing on population during the fifties was 829 people per year.

The estimates presented in table 4 strongly suggest that manufacturing was *relatively* more important to the growth of Missoula during the fifties and the University was *relatively* more important during the sixties.[15] The average annual impact of the University on population, disposable income, and retail sales is significantly larger between 1960 and 1970 than during the 1950-60 period—for several reasons. First, the average annual change in enrollment grew tenfold between decades. This was accompanied by increases in the effect of a one-unit change in student enrollment on population and disposable income. The combined effect led to the dramatic increase in the total impact of the University on the Missoula economy.

The average annual impact of manufacturing on population and retail sales during the sixties

[14]Census data for 1960 and 1970 lend some credence to this explanation. In 1960, females constituted 8.5 percent of manufacturing employees in Missoula County. By 1970 this figure had risen to over 10 percent.

[15]This certainly should not be interpreted as saying that the University had no effect during the fifties and manufacturing had no impact during the sixties. Rather, here we are concerned only with the relative importance of these factors on the growth of Missoula.

Table 4

Average Annual Impact of the University of Montana and Manufacturing on the Missoula Economy 1950-1970

	Population		Retail Sales (in 1958 Dollars)		Disposable Income (in 1958 Dollars)	
University of Montana	**1950-60**	**1960-70**	**1950-60**	**1960-70**	**1950-60**	**1960-70**
(1) Effect of a one-unit change in enrollment	1.28	2.66	6,644	6,189	6,329	9,119
(2) Average annual change in enrollment	36	394	36	394	36	394
(3) Average annual impact of the University [(1) X (2)]	46.08	1,048	239,904	2,438,466	227,844	3,592,886
Manufacturing						
(4) Effect of a one-unit change in employment	14.30	0†	20,575	7,663	7,991	9,637
(5) Average annual change in employment	58	65	58	65	58	65
(6) Average annual impact of manufacturing [(4) X (5)]	829.40	0	1,193,350	498,095	463,478	626,405

Source: Derived from data in table 1.

†Assumed to be equal to zero; see text.

fell far below that of the previous decade and that for disposable income registered only a negligible increase. The reasons for this are not hard to find. The average annual change in manufacturing employment increased only marginally, from 58 to 65 per year, between decades (table 4). In addition, the effect of a one-unit change in manufacturing employment on population and retail trade dropped significantly. Thus, the net effect was a decrease in the total impact on population and retail trade.

With these findings in mind, we may turn back to the graphs of figure 1 and see how they reinforce the conclusions of the sophisticated statistical analysis. Notice that manufacturing employment reached a peak in the early sixties and then remained approximately constant. On the other hand, the trends in population, disposable income, and retail sales continued upward even after the growth in manufacturing ceased. This implies that student enrollment, which also displays this upward trend, must have had an important role in determining the growth in these indices of the Missoula economy during the later years.[16]

What, then, can we conclude concerning the economic growth of Missoula between 1950 and 1970? Certainly both the University and the lumber and wood products industry are crucial to the vitality of this valley and it would be folly to suggest that either be relegated to a secondary role. However, the evidence is quite clear on one point: the relative importance of manufacturing on the overall growth of Missoula was greater during the first ten years of this period than during the latter. Conversely, the University played a larger role in the continued economic expansion after 1960.

We can only speculate as to the implications of this analysis for the future. Our calculations of the total impact of both the University and the lumber and wood products industry are in terms of two factors: the effect of a one-unit change in enrollment or employment and the annual change in these magnitudes. We have seen that the effect of a one-unit increment can differ significantly between decades. Unfortunately, present information is not sufficient to reliably predict what will happen to these values in the future.

The crystal ball is a little less cloudy (though not very rosy) with respect to the future changes in manufacturing employment and student enrollment. The Montana Economic Study projects that, statewide, employment in the lumber and wood products industry will continue to grow, but at a rate far below that experienced in the past.[17] If this is also true for Missoula, we can expect little in the way of growth stimuli originating from this sector.

Shortly before this issue of the *Quarterly* went to press, we received word of the sale of The Anaconda Company's Bonner mill, located just east of Missoula, to the U.S. Plywood-Champion Company. Final plans have not yet been released, but according to the latest news stories the Bonner plant closed on June 30, 1972, with the loss of about 650 manufacturing jobs. The new owners plan to reopen the facility and predict an eventual work force equal to or greater than that maintained by Anaconda. Unfortunately, this level may not be reached for another eighteen months.

We have not had time to study and assess the impact of this decision. The results presented in table 3 may provide a quick and easy way to estimate the effect of this closure on the Missoula economy. For example, using the 1960-70 figures, it may be predicted that retail sales (in 1958 dollars) will drop by $4,980,950 (650 X $7,663) because of this decrease in manufacturing employment. This procedure, however, must be interpreted with caution. First of all, the estimates in table 3 apply only to small changes in manufacturing employment or student enrollment (that is why they are entitled "Effect of a One-Unit Change"), not the closure of an entire plant. Secondly, these estimates assume that changes in enrollment or employment will be permanent and that enrollment or employment will not revert back to their old levels in a short period.

We anticipate that all of the employees of the Bonner mill will not leave Missoula immediately after the closure. Some may be immediately rehired. Others may find different jobs, exist on unemployment insurance, or live off their savings and bide their time until they are rehired by the new owners. During this transitional period, they

[16]Once again, it should be emphasized that this does not imply that the University was the only cause of continued growth. Other factors, which have not been explicitly considered because of data deficiencies, probably also played an important role.

[17]*Montana Economic Study*, pt. 1, vol. 2, chaps. 2-4, p. 4.18.

continue to live in Missoula and contribute to its economy, albeit at a much lower level. Thus, we think that the sale will have a significant impact on Missoula during the changeover period, but that it will be less than what would be predicted by using the estimates from table 3. Correspondingly, the positive stimulus provided by the reopening will also be smaller than otherwise expected.

College and university enrollments, both in Missoula and nationwide, have been increasing at a rapid rate. However, a number of arguments can be made that the era of rapid college and university growth will come to an end. Present economic conditions, the rising costs of higher education, and the reduction or elimination of the military draft may all be expected to lead to a more moderate growth in higher education. Further, the fiscal crises occurring at the state level have severely restricted university funding. If this continues, the University of Montana may have to adopt a policy restricting enrollment. In any case, the previous analysis and findings leave little doubt that the University of Montana is one of the cornerstones of economic growth in Missoula and that any slowdown in growth will affect the entire community.

We have seen that Missoula's robust performance over the past two decades has been based on the growth of the lumber industry during the fifties and enrollment growth at the University of Montana during the sixties. If the projections concerning the lumber industry and student enrollment are correct, then the prospects for a continuation of these buoyant trends are rather bleak. The two pillars which have supported Missoula's growth in the past will probably crumble in the near future. Thus, unless the projections are wrong, continued economic growth in Missoula must derive from a new source.

Some might suggest that the tourist industry is a likely candidate. But tourism, at best, is only seasonal and supports mostly low-wage jobs. Others believe that Missoula's emergence as a regional trade center, drawing consumers from the hinterland to buy from its merchants, will provide the necessary stimulus. However, a quick review of the statistics reveals that the surrounding area is also growing slowly and would contribute little in the way of increased trade. Finally, new small-scale manufacturing firms may provide the answer. This possibility cannot be ruled out, but it seems doubtful that enough new firms will locate in Missoula to provide an impact equivalent to that provided by the lumber industry and University enrollment in the past. In short, if Missoula's performance during the fifties and sixties is to be equaled in the seventies, present trends must be reversed or a new source of growth found.

Editor's Note: *The Dialog section of this journal is designed to bring our readers different points of view on an important subject by authors who are specialists in that field.*

In the first of these two articles, Mr. Claude S. Brinegar, President of the Union 76 Division of the Union Oil Company of California, questions the value of business education—particularly in management—for undergraduates.

In the accompanying article, Kermit O. Hanson, Dean of the School of Business Administration at the University of Washington and President of the American Association of Collegiate Schools of Business, defends the concepts and practices of undergraduate business education.

Can Business Be Taught?

CLAUDE S. BRINEGAR

For nearly a decade I have been involved in various levels of management of one of the country's major corporations. During those years I have personally hired many first-job and early career college graduates, and I have been indirectly responsible for the hiring of a great many more. During those years, I have also picked many early career people for major promotions, and I suspect that I have fired, or caused to be fired, an equally large number. What, it seems fair to ask, have those experiences taught me about education and about its relationship to managerial success?

My puzzling answer, after some reflection, was, "Very little." And equally puzzling was the realization that as the years have gone by I have become increasingly indifferent to the question of what a man's education was. But a businessman's viewpoint on business education should be of value to business teachers, so I began to collect my thoughts on what I liked or disliked about business education and whether business or management can actually be taught.

Some spare time reading and research uncovered others who were also expressing various kinds of concerns about the nature of business education. Four items, which supplement my subsequent discussion, are worth mentioning in some detail.

Item 1. In an article in the January-February 1971 issue of the *Harvard Business Review*, titled "Myth of the Well-Educated Manager," Professor J. Sterling Livingston of the Harvard Business School laid it on the line in three powerful opening paragraphs:

> How effectively a manager will perform on the job cannot be predicted by the number of degrees he holds, the grades he receives in school, or the formal management programs he attends. Academic achievement is not a valid yardstick to use in measuring managerial potential. Indeed, if academic achievement is equated with success in business, the well-educated manager is a myth.
>
> Managers are not taught in formal education programs what they most need to know to build successful careers in management. Unless they acquire through their own experience the knowledge and skills that are vital to their effectiveness, they are not likely to advance far up the organizational ladder.
>
> Although an implicit objective of all formal management education is to assist managers to learn from their own experience, much management education is, in fact, miseducation because it arrests or distorts the ability of managerial aspirants to grow as they gain experience. Fast learners in the classroom often, therefore, become slow learners in the executive suite.

Item 2. Willard F. Rockwell, Jr., Chairman and Chief Executive Officer of North American Rockwell Corporation, recently collected his experiences and observations on how to run a large company in a book titled *The Twelve Hats of a Company President.*[1] Since such a top job is an obvious goal of business education, it is worthwhile to see whether the skills offered by a typical business school curriculum differ from the list of skills implied by Mr. Rockwell's "twelve hats." It takes little research to see that his list generally reflects a different approach from a

[1]Willard F. Rockwell, Jr., *The Twelve Hats of a Company President* (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1971).

Claude S. Brinegar is President of the Union 76 Division of the Union Oil Company of California. This article is a revised version of a talk that he delivered on October 29, 1971, to the Northwest Universities Business Administration Conference in Portland, Oregon.

business school's, for he notes that "Each (hat) covers a multitude of psychological nuances, offbeat techniques, and little known strategies of successful executive leadership."

Item 3. James Newman, an experienced business executive and now Chairman of The Newman Foundation, has spent many years studying the question of why certain business managers out perform others. From this research he has developed training seminars designed to teach high performance management. I have found that his techniques are successful. Deferring the details, it is sufficient to note that the key managerial qualities that Mr. Newman concentrates on, like Mr. Rockwell's list of key managerial roles, differ conceptually from the skills offered by the typical business school curriculum. In fact, Mr. Newman notes that highly successful business leaders often mistakenly credit "education" as a key factor in their own success. In his view, education is only one of several factors that may serve as a useful building block. To him, it is not an essential one.

Item 4. Peter F. Drucker, in a March 1969 talk titled "The Relevance of Management Education," made several bold but telling statements, in true Drucker style. Three of his sentences amply make his point: "I have been concerned for some time with the irrelevance of what we are doing in management education. . . . We have pretended that management is a science when it is reasonably clear that it is primarily a clinical practice. I have serious doubts that the teaching of business to undergraduates makes much sense."

Finding myself allied with such illustrious company as professors Livingston and Drucker, I began to feel, as Mark Twain once expressed it, "the calm confidence of a Christian with four aces." Calmly, then, I asked myself: *Can* business be taught?

To me the term "teaching business," properly used, should describe the process whereby educators endeavor to prepare a student to become a successful broad-gauge manager in a business organization. I do not believe the term should be used in connection with the training of accountants, computer systems specialists, statisticians, personnel managers, and others who aim for a career using specific technical skills. I view "business education" as the training of business managers; the training of, say, accountants is something else. The accountant or other such specialist can, of course, break out of his specialty into managerial ranks, as many do, but when he does he will be no longer using the skills of the specialist.

If we accept this distinction, the question then breaks into two parts: What key qualities does it take to succeed as a manager? In what way can formal education contribute to the development of these qualities? Starting with the first one, here are what I have discovered, largely by trial and error, to be the key qualities of the successful business manager.

Number one on my list is the "will to manage." Marvin Bower, for many years managing director of McKinsey & Company, distilled his entire consulting career into a book titled simply *The Will to Manage.*[2] In his "Myth of the Well-Educated Manager," Professor Livingston echoed this point when he observed that "A major reason why highly educated and ambitious men do not learn how to develop successful managerial careers is that they lack the 'will to manage.' " Time and again, as I try to understand why one manager out performs another, it finally comes down to "will." One has the "will," and one does not. "Will," of course, is not enough to build success on and, in fact, when mixed in the wrong proportions can be deadly. Sewell Avery directed his iron will, as he grew older, to the misguided objective of hoarding Montgomery Ward's cash for a crisis that never came and, as is now well known, dealt that fine company a serious blow. "Will" isn't enough but "will" must head the list.

Second on my list I place the manager's willingness to develop, install, and live by a management *system.* The concepts of such a system are not hard to learn—I'm sure most graduate courses in management theory deal with them adequately. Chapter I of Marvin Bower's book lists fourteen basic components of a managerial system, starting with "setting of objectives," and proceeding through "planning strategy," "establishing goals," ending with "providing control information," and "activating people." Later chapters expand on these topics. The concepts are understandable; the discipline of forcing yourself and your subordinates to live by them is hard. But without the underpinning of

[2]Marvin Bower, *The Will to Manage* (New York: McGraw-Hill Book Co., 1966).

such a system, a large company stands little chance of controlling its own destiny.

In third position I list the ability, the frame of mind, the breadth—call it what you may—of the individual to grasp the *totality* of his managerial job. It's trite but true to keep saying that it's a complicated, interrelated world. But how complicated and how interrelated can't be really appreciated until you've personally tried to deal with it. A research program, a new product line, a new plant, a new selling method, even a new financing technique—all have the potential to affect your company in unexpected ways. A manager who conceives of his boundaries as "research," or "sales," or "production," or "finance" cannot be rated a managerial success. He may be lucky and succeed despite his narrowness, but more than likely his decisions will, in time, do his company more harm than good.

Some managers have a natural flair for "total system" thinking; some achieve it through the discipline of a careful and experienced approach, plus a good staff; and some seem forever unaware of even the concept. This last group can be useful, loyal people—but they must be supervised carefully.

Barry Commoner's new book, *The Closing Circle,* lists four laws of ecology.[3] His first law states: "Everything is connected to everything else." Though businessmen and ecologists have their differences, I readily accept this law and, in fact, would bring it to bear directly on the world of business. Everything is indeed connected to everything else, and the successful manager must constantly recognize and somehow deal with this fact.

Two other key qualities of management are so closely related to "total system" thinking that they perhaps should be included under it. The first is the ability to comprehend and cope with your company's relationship to the nonbusiness organizations with which it increasingly must deal. There perhaps was a time when business was a separate sector that could concentrate on profit maximization. But now, rightly or wrongly, the role of business is no longer so narrow. Today we must accept the fact that we are caught up in a world of organizations. Whereas we once concentrated on customers and competitors, today we must also deal with layers of governments and myriads of public groups and nonbusiness organizations.

The other needed management quality that is closely related to "total system" thinking is the ability to manage in an environment that is an unknown mixture of the rational (at least as defined by the manager) and the irrational. Since our world of organizations is managed by humans, we must, of course, deal with unpredictable and occasionally irrational human behavior. The top level manager who approaches his job as if it were a collection of computer circuits, each with predictable responses to specified inputs, is headed for trouble. The unexpected must be met with positive, prepared action, not with an inflexible, unbelieving mind. A recent *Wall Street Journal* essay, titled "On the Limits of Rationality," started with these words:

> The intellectual agenda for the next quite a few years can be summed up in a question: What went wrong with the 60's? The answer will take time, but surely an important part of it is that so often—whether fighting in Vietnam, eradicating poverty or managing the economy—we thought we knew far more than we actually did.

Dr. Arthur Burns was expressing this view when, in July 1971, he told a Congressional Committee: "The rules of economics are not working quite the way they used to." If a business manager is to deal with such turns of events, his viewpoint must be broad and his mind flexible. "Stay loose" is a popular way of saying it. But when you're personally faced with an onrush of unexpected events—and so often they seem to come in bunches on Friday afternoon after a tiring week of travel and meetings—staying loose is easier said than done.

Returning to my list of key managerial qualities, number four concerns the skill with which the manager decides *what* to work on—how he filters out the important from the trivial and how he allocates his personal time to selected tasks. It has been my experience that decision making, in the sense of a final "yes" or "no," while important, is not the major challenge. Good staff work will usually make the correct decision reasonably clear. The manager's really important decision is in deciding what should be worked on in the first place. He must identify the "profit levers" that deserve work and he must discard interesting but largely blind alleys. Just about the worst thing a top level manager can do is to assign his most

[3]Barry Commoner, *The Closing Circle* (New York: Alfred A. Knopf, 1971).

talented people to the job of solving the wrong problems. A close second is delaying work on problems until they demand action. The successful manager senses changes in the external environment and seeks out opportunities that these changes may offer, or else he finds a way to make changes in order to create new opportunities. He doesn't sit waiting to see what might show up in tomorrow's mail.

Fifth on my list of key managerial qualities is the ability to understand the nature of *power,* coupled with the desire and willingness to use it. "Power" may be a vague and not-quite-nice concept to some, but to others it's something to be grasped, measured, and applied with subtle skill. The thrill of its use may even trigger an extra burst of energy, thus further adding to the manager's effectiveness. Power can be used for personal advancement, to gain supremacy over a competitor, or to win in a showdown with a labor union. On the other hand, the manager who fails to measure his power properly or who fails to use it when he should can find himself and his company hopelessly mired in meaningless, losing battles. Professor Livingston in the "Myth of the Well-Educated Manager" recognized the key role of "power," noting that: "The competitive battle to advance within an organization . . . is much like playing 'King of the Hill.' Unless a person enjoys playing that game, he is likely to tire of it and give up the struggle for control of the top of the hill. The power game is a part of management, and it is played best by those who enjoy it most." Adolf A. Berle, the distinguished lawyer-economist, devoted his final years to writing a book titled simply *Power.*[4] The opening words emphasize the subtleness of the concept: "Power and love are the oldest known phenomena of human emotions. . . . Neither wholly yields to rational discussion; poets have as good insights as philosophers."

The sixth item on my list of key qualities is the possession of a fair number of the essentially personal behavioral characteristics identified by James Newman in his studies of high performance people. I can summarize these characteristics briefly (if inadequately) by saying that the high performance manager has:

—A sense of high self-esteem; a feeling of worthiness.
—A willingness to be accountable for his actions; to be able to say, "I did it," whether the outcome is good or bad.
—A feeling of optimism about what lies ahead.
—The ability to be goal directed; to both set and achieve goals.
—The ability to be imaginative; to visualize events in advance.
—A sense of awareness of what's going on.
—A creative approach to life; a way of challenging things—important or trivial—to see if they can't be done better.
—The ability to communicate to an exceptional degree, including the understanding of others' points of view, and a willingness to work extra hard to make sure his own messages get through.
—The ability to respond to pressure with peak performance; pressure, in fact, seems to bring out the best in a high performance manager.
—A sense of urgency—of "nowness"—about getting things done.

Some of these traits probably overlap other qualities that I've discussed. But as mentioned earlier, I've found that a person's relative score on these traits offers important insights into how he will actually perform when given a responsible managerial assignment.

So much for my appraisal of the key qualities of a business manager. Since it is difficult to see how these qualities can actually be "taught," how then should an educator approach his job of *developing* them in his business majors?

As an overriding statement of educational philosophy, I'm drawn to a comment of Alfred North Whitehead:

> Whatever be the detail with which you cram your student, the chance of his meeting in after-life exactly that detail is almost infinitesimal; and if he does meet it, he will probably have forgotten what you taught him about it. The really useful training yields a comprehension of a few general principles with a thorough grounding in the way they apply to a variety of concrete details. In subsequent practice the men will have forgotten your particular details; but they will remember by an unconscious common sense how to apply principles to immediate circumstances.[5]

[4]Adolf A. Berle, *Power* (New York: Harcourt, Brace & World, Inc., 1967).

[5]Alfred North Whitehead, *The Aims of Education and Other Essays* (New York: Macmillan Co., 1929).

The "few general principles" that I think should be hammered at by business faculty include the following:

—Rudiments of the world's major political systems.
—Rudiments of the world's major economic and monetary systems.
—Rudiments of our admittedly meager knowledge of human behavior, including organizational behavior and negotiating principles.
—A solid grounding in corporate strucutre, corporate finance, and budgetary accounting.
—A solid grounding in statistical procedures, including sampling, inference, and decision theory.

I would encourage educators to find ways to make these principles come alive by tying them to substantial research projects. Since graduates need enough specialization to enable them to find their first jobs, these projects could be set in their fields of special interest. The project should show depth of thinking and thoroughness—a student should be at it until he succeeded. Written reports should be graded hard on writing style and on directness. Educators should stress, over and over, the need to conceive of a project, to think it out, to do the research, and to push it to completion. It should be made clear that the development of an "unconscious common sense" in business management involves a great deal of hard work.

Students who understand these rudiments reasonably well and who show evidence of "will," of "total system" thinking, and the ability to understand and use "power" should be encouraged to go further; those who do not should be discouraged. The top handful, especially those with business experience between their undergraduate and graduate programs, should be assigned such tasks as developing the framework of a management system for a billion dollar company with a dozed multinational divisions, or for the New York City traffic department, or IBM's new products group, or a research center seeking a cure for cancer, or the Environmental Protection Agency, or the Catholic Church.

I believe that educators should urge their promising students to go out and work for a year or two between their undergraduate and graduate years. As Peter Drucker emphasized in "The Relevance of Business Management": " . . . [management] is primarily a clinical practice. . . . Many of the things we want to teach are not accessible to people without experience." This recommendation was also a major one in the recent *Report on Higher Education,* headed by Professor Frank Newman of Stanford:

> Undergraduate and graduate admissions policies should be changed to favor students who have had experiences outside school. . . . Graduate schools . . . should consider requiring a break in college attendance of 1 or 2 years as a condition of admission. . . . Educational internships . . . should be greatly expanded.[6]

I believe that educators should also attempt to help promising graduate students better understand their competency. I have found that young MBAs, as a group, tend to overestimate their abilities, thus setting the stage for early career disappointment. Youthful optimism and drive are desirable characteristics; youthful naivete is not. Sidney J. Harris touched the heart of the matter in a recent column devoted to the subject of "knowledge." "One of the main purposes of 'knowing' any subject really well," he wrote, "is to give us a standard of what *knowledge* really means. . . . Only when we know what we do not know can we begin to learn something."

Finally, I would encourage educators to work harder at helping students develop a better understanding of the key role of business in the American system and of the role of the businessman. Both business and businessmen have been—and continue to be—excessively maligned by Hollywood, by TV, and by writers of fiction, perhaps because the distortions make a better story. Strangely enough, many presumably competent business reporters are contributing to this deception by twisting stories to make business firms look like insensitive behemoths and business leaders like 19th century robber barons. Businessmen's skins are thick, but when these deceptions begin to be taken seriously by students and even by some faculty, I think it's high time to push the pendulum back to the center.

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[6]U.S. Department of Health, Education, and Welfare, *Report on Higher Education* (Washington, D.C., 1971), pp. 67-68.

Finally, let me return to the key question: *Can business be taught?* Does teaching help students become more effective managers of businesses? I'm afraid I must answer, "Only to a slight degree."

Present day undergraduate business education seems to me to be especially vulnerable to the charge that it is not living up to its stated objective. Nor do I think that it will easily find a way to do so. It may be adequately training accountants, personnel managers, and other business specialists to handle their first jobs—but this should scarcely be called a "business education." Perhaps the undergraduate "business" major is an obsolete concept and should be replaced with degrees—such as a Bachelor of Arts in Accounting—that better describe the graduate's competency.

At the graduate level, I believe it is possible to single out and help those students who show promise of success in business management, especially those with prior business experience. I think that educators should broaden their sights to embrace not just the teaching of business management but the management of all organizations. The main elements are common to all, and these other organizations very much need competent management, just as do the nation's business firms. To this end a degree of "Master of Organizational Management" makes more conceptual sense to me than the "Master of Business Administration."

Herbert Spencer wrote, "The great aim of education is not knowledge but action." The business world is throbbing with action. There is a pressing need for the nation's educators to find new ways to deliver graduates that are increasingly ready, willing, and able to join this action.

Business Schools in Perspective

KERMIT O. HANSON

Education for business and management careers undoubtedly will be a topic of debate for long years to come and perhaps indefinitely—just as other major components of our educational system and our society are debated. Appraisal and reappraisal are healthy and, indeed, essential to insure continued development in the future. In undertaking such appraisals every effort should be made to gain an understanding of the roles of undergraduate and graduate programs and their current stages of development. Without a clear perception regarding these fundamentals, such appraisals may be seriously lacking in objectivity—unable to relate performance to goals or objectives, thus, they are likely to consist primarily of opinions and misconceptions. President John F. Kennedy in a June 1962 commencement address at Yale University stated, ". . . the great enemy of the truth is very often not the lie—deliberate, contrived and dishonest—but the myth—persistent, persuasive, and unrealistic. Too often we hold fast to the cliches of our forebears." The purpose of this article is to comment briefly on the roles of undergraduate and graduate education for business and management in a manner that will provide clearer perspectives for those who are concerned with the need for these programs and for the continued enhancement of their quality.

Origin of Education for Business

Although commerce and trade have long shaped the destinies of nations, business education is a relative newcomer to the university. It is newer than engineering, and much newer than law or medicine. But unlike much of our university curricula, education for business is strictly American in origin.

The first business program to be established and to be offered continuously was the Wharton School of Commerce and Finance, founded in 1881. The next business schools to be established at the university level were at the University of California at Berkeley and the University of Chicago, both in 1898. About a dozen business schools had been formed by the outbreak of World War I and approximately one hundred by World War II. The greatest expansion has occurred since World War II; it has been estimated that university and college degree programs currently are offered in some six hundred institutions. From the mid-1950s to the present, programs patterned after American business education programs have been established in countries throughout the world. Professors from American schools have played a key role in this "exportation" of education for business careers.

Enrollment of students in business degree programs also has increased substantially during this relatively brief period. A table on "Trends in Higher Education to 1979-80" published in *The Chronicle of Higher Education*, June 7, 1971, revealed that 102,650 students earned bachelor degrees in accounting, business, and commerce during 1969-70; this number, which represents 13 percent of the total number of bachelors degrees granted, is projected to increase to 121,700 by 1979-80. Masters degrees in accounting, business, and commerce were awarded to 24,440 students in 1969-70 (11 percent of the total masters degrees granted) and were projected to increase to 64,730 by 1980 (15 percent of the

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total). A nationwide survey of this year's (1971-72) freshman class has revealed that 16.4 percent reported business as their probable major field; the next largest probable majors were education (9.9 percent), fine arts (9.0 percent), and health professions, non-M.D. (8.8 percent).[1] These data make it abundantly clear that programs of education for business have become major components of university and college instruction at both the undergraduate and graduate levels. Hopefully, continued publication of data such as these will serve to dispel the myth that young persons today are disinterested in business careers.

One often hears charges that the students attracted to business programs are of lower academic quality than those entering traditional academic programs. Similarly, charges have been made regarding the lack of rigor and standards in business programs. Some evidence supporting these views was presented in reports issued by the Ford Foundation and the Carnegie Corporation in 1959.[2] In publishing a summary review of these reports by Leonard Silk, Dr. Floyd A. Bond (Director, Business-Education Division, Committee for Economic Development) made the following statement in his Foreword:

> . . . it would be unfortunate indeed if the public were to get the mistaken notion that the Gordon-Howell and Pierson reports condemned business education generally as unworthy of American youth. Some programs probably are, whereas others are not. Some business schools are weak; some are strong. Many have low admission standards; others have high. The quality of the faculty and students in some schools is low; in others, the quality is high. And so it goes. With 160 separately organized schools of business, standards are bound to vary widely. And with 400 formal degree programs in business education offered by departments or divisions of liberal arts colleges and universities, it is very misleading to infer anything about one institution from averages based on all. This point should be kept in mind constantly in reading this review and the two studies themselves. . . .[3]

In the concluding section of his review, Leonard Silk writes:

> We are dealing here with a complex and evolving problem, for the solution of which the business schools themselves are anxiously searching for help and guidance. . . .
>
> This is a hopeful sign. Indeed, the fact that the business schools, like poor countries bent on economic development, are feeling so much discontent and strain may be the surest sign that growth is beginning. Many are feeling the pressures of the "demonstration effect" of their successful neighbors. In recent years, a few business schools have obviously entered a new dynamic phase; they are attracting to their faculties men of the highest scholarly reputations, and first-rate students as well. They are also gaining genuine prestige in the business world—and they are demonstrating their usefulness to business. . . .[4]

It is not at all surprising that business schools, the newest major units in universities and colleges, would be near the lower range of the academic "pecking order" in their faculty, students, and, indeed, resources necessary for improvement. Neither, in retrospect, should it be surprising that schools of business and management have continued to improve their curriculum, faculty, and students in recent decades. Demand for business graduates has been very strong since World War II, and major business schools have developed a considerable number of quality doctoral programs to educate persons seeking careers as professors of business and management. Recognition of this trend is provided in the *Report on Higher Education* published by the U.S. Department of Health, Education, and Welfare in 1971: ". . . some professional schools—particularly in law, medicine and business—have been gaining in academic prestige and attracting better students. . . ."[5] Admission requirements and curricular requirements also reflect considerable changes since World War II. For example, an increasing number of business schools

[1] *The Chronicle of Higher Education* (January 10, 1972), p. 4, citing a survey by the American Council on Education.

[2] Robert Aaron Gordon and James Edwin Howell, *Higher Education for Business* (New York: Columbia University Press, 1959); and Frank C. Pierson, *The Education of American Businessmen: A Study of University-College Programs in Business Administration* (New York: McGraw Hill Book Co., 1959).

[3] Leonard Silk, *The Education for Businessmen* (New York: Committee for Economic Development, 1960), pp. 4-5.

[4] *Ibid.*, pp. 40-41.

[5] U.S. Department of Health, Education, and Welfare, Office of Education, *Report on Higher Education* (Washington, D.C.: U.S. Government Printing Office, 1971), pp. 36-37.

now require proficiency in mathematics through the introductory calculus level. Students who lack motivation and/or academic ability no longer gravitate into business schools because of the low requirements and standards they expect to find there.

Accreditation

The American Association of Collegiate Schools of Business (AACSB) has been a major force in the improvement of education for business and management. Founded in 1916, the Association has increased its membership steadily. In 1961 the National Commission on Accrediting formally charged AACSB with the responsibility for accrediting undergraduate programs; a year later the Commission assigned AACSB responsibility for the accreditation of masters programs. At present, 137 undergraduate programs and 94 masters programs have been accredited by AACSB.

A brief review of some of the standards for accreditation should help to dispel a few of the myths regarding the nature and objectives of business curricula. The following excerpts reveal a breadth of exposure in the liberal arts which may come as a surprise to those who assume that business programs are narrow and vocational in nature.

> The purpose of the curriculum shall be to provide for a broad education preparing the student for imaginative and responsible citizenship and leadership roles in business and society. The curriculum shall be responsive to social, economic, and technological developments and shall reflect the application of evolving knowledge in economics and the behavioral and quantitative sciences. To facilitate the foregoing, the Association encourages continuing development and appraisal of both new and existing curricula.
>
> An undergraduate school of business should concentrate its professional courses in the last two years of a four-year program, and should offer only a limited amount of work below the junior year. The objective of this is to permit the student to acquire a foundation of work in the basic arts and sciences. The arts and sciences foundation of the student should normally include work in mathematics, social sciences, humanities, and the natural sciences.
>
> Normally, forty to sixty percent of the course work in the undergraduate program shall be devoted to studies in business, economics, and administration. Normally, forty to sixty percent of the course work shall be devoted to studies other than business, economics, and administration.[6]

The observant and knowledgeable reader will note that in many respects a student may gain a more "liberal" education by pursuing a bachelors degree in business and management than by pursuing a more narrowly specialized major in a college of arts and sciences.

A sharper perspective of the business curriculum is provided by this further excerpt from the AACSB Standards:

> To provide students with the common body of knowledge in business and administration, programs shall include in their course of instruction the equivalent of at least one year of work comprising the following areas:
>
> (a) a background of the concepts, processes, and institutions in marketing and distribution, production, and financing functions of business enterprise;
> (b) a background of the economic and legal environment of business enterprise along with consideration of the social and political influences on business;
> (c) a basic understanding of the concepts and methods of accounting, quantitative methods, and information systems;
> (d) a study of organization theory, interpersonal relationships, control and motivation systems, and communications;
> (e) a study of administrative processes under conditions of uncertainty including integrating analysis and policy determination at the overall management level.
>
> Opportunities for advanced work in some of the subject areas should be provided consistent with the school's objectives and capabilities.
>
> Masters degree programs in business must require students to have completed, either at the undergraduate or graduate level, the equivalent of the common body of knowledge in business and administration as set forth above.
>
> For the MBA degree, it is expected that the program beyond that in the common body of knowledge shall be broad in nature and aimed at general competence for overall management.
>
> For other masters degrees, the limitation on specialization will not apply.[7]

The reader may recognize a noticeable similarity between the five "core" areas listed above

[6] American Association of Collegiate Schools of Business, Inc., *Accreditation Standards and Interpretations, 1971-1972* (St. Louis, n.d.), p. 34.

[7] *Ibid.*, p. 36.

and the "few general principles" which Claude S. Brinegar stated "should be hammered at by business faculty" in his article entitled "Can Business be Taught?" which appears as a companion to this one in the *Dialog* section of the *Montana Business Quarterly.* All business students, in addition to the above core areas, will complete more advanced courses in one or more areas of study (e.g., accounting, finance, marketing).

Undergraduate versus Graduate Education for Business

The CED report in 1964, which has been referred to earlier, emphasized the need for both graduate and undergraduate schools of business and also recognized their different roles:

> A distinction needs to be drawn between the roles of the graduate and undergraduate schools of business. The graduate schools must lead the way in developing business studies, discovering better educational methods, communicating new knowledge to business and other social institutions, producing first-rate business teachers and researchers, and preparing high-calibre men for business careers. Some graduate schools of business are the equal of the best professional schools in other fields; but *all* graduate business schools should aim for high quality.
>
> Undergraduate schools and departments of business administration must provide both a liberal and a specialized education for large numbers of young people. Although relatively few graduates will reach high executive rank, all can make significant contributions at different levels and in different types of business, small and large. Work must be done at all levels of every business organization, and men and women can find great personal satisfaction in many different types of jobs.[8]

I hold the firm opinion that there is an important role for both undergraduate and graduate programs in business and management. From a student's point of view the decision to seek a masters degree in business and management requires an additional investment of time (two years) and money (tuition, books, personal expenses, and the like). Also, higher admission requirements for graduate programs limit the possibility of enrollment to a relatively small proportion of bachelors degree graduates.

My advice to a freshman or sophomore who desires a career in business and management and who is in a position to "invest" only four years of time and money (educational costs) would be to enroll in an undergraduate program in business and management. My advice to a student in a position to "invest" six years of time and money would be to earn a bachelors degree in some other field or discipline and then enroll in a masters program in business and management. This advice should in no way be interpreted as "downgrading" undergraduate education for business and management. Rather, it should be regarded as a guidance to combine two areas of study (e.g., engineering and business) to achieve a "product" in high demand. A student planning a corporate legal career might well be advised to earn a bachelors degree in business and management before proceeding to law school.

So long as large numbers of students preparing for business careers are not in a position to invest six years of time and money in educational programs, there will continue to be a significant role for undergraduate programs in business and management. If the level of affluence of our society rises considerably, the need for graduate programs in business and management will rise, but it appears unlikely that the need for undergraduate programs will ever be eliminated. Indeed, the College Placement Council recently made special note of the demand for business graduates at the bachelors level: "At the bachelor's level, business students fared the best with a nine percent increase over last year. The demand for majors in science or mathematics went up four percent, while the hiring of engineering candidates stayed at about the same level as a year ago. Nontechnical majors, other than business students, found the job market exceptionally tight with a six percent decrease. . . ."[9]

The issue really is not whether a four-year program culminating in an undergraduate degree in business is comparable to a six-year program embracing a bachelors degree in some other discipline plus a two-year masters degree in

[8]Committee for Economic Development, *Educating Tomorrow's Managers: The Business Schools and the Business Community* (New York, October 1964), pp. 27-28.

[9]American Council on Education, *Higher Education and National Affairs*, vol. 21, no. 25 (Washington, D.C., June 27, 1972), p. 5.

business. Rather, the issue is whether two years of liberal arts plus two years of undergraduate business and management is better preparation for business than four years of liberal arts. A survey of 1,850 executives in 1960 revealed a strong preference for the former—two years of liberal arts plus two years of business.[10] This preference continues to be demonstrated annually in the higher average salaries which business and management bachelors degree graduates receive in comparison with salaries offered liberal arts degree graduates who seek business and management positions. My prediction is that this preference will continue to be reflected in the "marketplace" for four-year college graduates.

Skeptics of undergraduate education for business cite, among other things, the success of persons in business who were educated in other disciplines or were self-educated as evidence that undergraduate programs in business are of questionable value. This is spurious reasoning. Management is an art as well as a science; entrepreneurship is a quality not possessed by everyone. Can "art" be "taught" in the sense that every art student is likely to become a great artist? Or every music student a virtuoso? Educational dropouts and self-educated persons have succeeded and will continue to succeed in many endeavors including business. But one should not overlook the large number of persons with degrees in business and management (both undergraduate and graduate) who hold senior executive positions in business and government; the roster of Beta Gamma Sigma (national honorary society for business students) members who have achieved positions as presidents and board chairmen is impressive. Nor should one overlook the aggressive recruiting of business graduates not only by business, but also by a host of government agencies and nonprofit organizations which have become aware of the great need for managerial talent in all fields of endeavor involving human and natural resources. Indeed, a number of schools, recognizing this trend, recently have changed their designations to "school of business and management" or simply "school of management." We clearly have passed the stage where we should be asking "can business be taught?" We should be aggressively seeking ways in which business and management can be taught more effectively.

[10]John S. Fielden, "Educating Tomorrow's Executives," *Harvard Business Review*, vol. 38, no. 6 (November-December 1960), p. 6.

Liaisons with Employers and the Community

If they are to achieve their full potential, all professional schools (law, medicine, engineering, business) must, on the one hand, maintain close linkages with underlying and related academic disciplines within the university and, on the other hand, maintain continuing liaison with the practicing members of their profession. In the case of business and management, the disciplines of the behavioral sciences, economics, and mathematics and statistics are particularly relevant. The "professional" sectors employing business and management graduates are varied and include government and nonprofit organizations.

So that representatives of these important sectors may become more involved with education for business and management, the American Association of Collegiate Schools of Business in 1968 created a new organization designated the AACSB Assembly with membership open to business firms, government agencies, and other organizations in addition to schools of business and management. Some fifty nonacademic organizations now hold membership in the AACSB Assembly. Representatives of these organizations participate in the annual programs and serve throughout the year on standing committees (standards, accreditation), school visitation teams, and the Assembly's Board of Directors. Organizational changes currently under consideration would establish an even closer integration.

An increasing number of schools at the local level are working with visiting committees and advisory boards. Items of concern include admissions standards, quality of curriculum, continuing education programs, faculty, research, placement and performance of graduates, and financial resource requirements. Many organizations cooperate with faculty in the development of case studies. It is not uncommon for students in selected business and management courses to work on "real" problems facing executives. In some instances students are paired off

with executives in research and problem-solving situations.

Several schools and organizations have been experimenting with executive-in-residence programs where executives, including partners of public accounting firms, spend a period of time in residence on the campus in association with faculty and students. During the past three years, seven executives have participated in such programs at the University of Washington, spending from one to three days on the campus each week during a quarter term while also continuing with professional obligations. Executives gain new perspectives regarding education for business and management, and faculty and students gain new insights regarding curriculum, instruction, and research.

A very important area of cooperation relates to financial support. In addition to the obvious need of financial aid for students, financial aid is needed for faculty development, research, and for computer and library resources. A CED report in 1964 stated that business schools will need more financial help than they have been getting and noted:

> There is a widespread but mistaken notion that schools of business are better off financially than other schools or departments of colleges and universities, thanks to generous private contributions by businesses or well-to-do alumni. On the contrary, of more than $900 million in voluntary support accorded to higher education during 1962-63, *only 1.7 per cent was specifically directed to business schools, although about 20 per cent of all students are in such schools.*[11]

Similarly, government agencies have channeled most of their aids for education to health sciences, engineering, natural sciences, and mathematics. Causes for this failure to allocate more funds for management education and research rest with the schools as well as with business, government, and the foundations. The critical need for greater managerial capability strikes a note of urgency for both the schools of business and their "partners" to devote increased effort and resources to improving the quality of education for business and management.

[11]Committee for Economic Development, p. 36.

Summary

Schools of business and management, American in origin, have a remarkable record of growth and achievement. Since the mid-1950s, they have served as models for schools of business and management which are being established in other nations. The stature of schools of business and management has improved markedly since World War II in terms of curriculum, faculty, and students. The critical need for managerial talent in all sectors of our society dictates that greater effort be exerted in the future to improve the quality of instructional efforts at both the undergraduate and graduate levels.

To achieve this goal a closer and more well-informed relationship must be established between business schools and the several sectors which employ their graduates. Substantial progress toward this end has been made in recent years. A carping attitude on the part of either business or education is likely to be counterproductive. I am confident that great strides will be made in education for business and management in the years ahead as the schools and their "professional partners" learn how to collaborate more effectively on a variety of research and experimental projects.

ALLEN C. BJERGO

Bitter Root Resource Conservation and Development Project

A community development in Western Montana

Background: The Community

The word "community" has assumed a number of meanings, and its definition varies widely. This article will take a look at what a particular group and several individuals in Montana's Bitterroot Valley have been doing to define the community for themselves and how through such understandings they may enhance their lives.

A. F. Wiledon, author of *Community Development* says: "The community is the smallest geographical unit of organized association of the chief human activities."[1] There are a great many different organizations and formal or informal subgroups which are subsystems of the community. They need not be centralized, nor need any of the subsystems be dominant in the community to build community development projects.

The community may be described as a social system which includes the goals and values of those who live there.[2] It comprises a complex of services, organizations, and institutions which serve the economic, educational, religious, health, and other needs of the area.[3]

Communities and neighborhoods include a third grouping which has been called "special interest groups." These include civic groups, churches, economic groups, and other assemblies not formally required by law. Within each are power structures, shared goals and values, and communication.[4] Any attempt to engineer planned social change, from the outside or by the community members themselves, requires knowledge of the community, for it is from the community that citizen action springs.[5]

A Model of the Community

There are horizontal and vertical ties in the community. Horizontal orientation is the web of all that unites the community: age group, economic status, political association, religion, and cultural activity. Vertical orientation is what affects the community from the outside.

Horizontal interaction is the predominant influence in a remote tribal village, for example, while a "company town" or military base housing development may have predominantly vertical ties, with goods, paychecks, direction, and family ties coming from outside the community.

In general, there is a combination of vertical and horizontal ties in any community. Strong horizontal ties are associated with kinship within the community, values and goals that unite, mutual concerns, and a balance among the elements of the horizontal web. Strong vertical ties are associated with a high degree of export of

[1]Arthur F. Wiledon, *Community Development* (Totona, N. J.: Bedminister Press, 1970), p. 17.

[2]Roland L. Warren, *The Community in America* (Chicago: Rand McNally and Co., 1963), pp. 48-49.

[3]Wiledon, *Community Development*, p. 38.

[4]Warren, *The Community in America*, p. 31.

[5]*Ibid.*, p. 49.

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products or raw materials, many ties to outside bureaus, hierarchies or corporate interests, and strong influence of outside systems, such as churches, unions, or mobile populations.[6]

Community Development

Community development is a deliberate and sustained effort to strengthen the "horizontal" pattern of a community.[7] This is a key definition in this paper, for it is the web of groups and subsystems in the community which makes community development possible, something which no amount of outside input can do alone. The author's experience in Vietnam points up the importance of the local contribution and local decision making as the focus of progress within the community. Without it, people have only the option to accept what higher authority presses upon them, or rebel against it.[8]

Roland Warren's study of community development defines it as: "A process by which a community identifies its needs or objectives, orders or ranks them, develops the confidence and will to work upon them, finds the resources (external or internal) to deal with them, takes action with respect to them and in so doing, extends and develops cooperative and collaborative attitudes and practices in the community."[9]

While these steps may describe the anatomy of one or more projects successfully completed in the community, the definition does not adequately describe the learning processes which strengthen intercommunity ties and ease the path to further development of other projects. The "problem approach" is often used in community development. It assumes that the learning process must start with people as they are and that it is futile to work with them in a voluntary situation until they have reached a certain state of readiness.[10] Some characteristics of community development are listed by Wiledon as:

1. A philosophy that informed local people are the only ones to make their own decisions and determine objectives.
2. A concern for helping citizens agree on desirable changes.
3. A belief that lasting progress can only be achieved through development of local understanding, local initiative, and local self-help with broad local participation.
4. An emphasis on balanced development of human and physical resources.
5. An assumption that outside knowledge and technical assistance must be available to local people on their own terms[11]

While community development traces its origin to groups organized early in this century, only in the past two decades has it received widespread attention, most often with the assistance of the Cooperative Extension Service based in the land-grant universities of each state.[12]

Community Development through Resource Conservation and Development Projects

Resource Conservation and Development Projects were authorized through the Food and Agriculture Act of 1962. They are based upon local sponsorship and control, with county and city governments and conservation districts commonly serving as sponsors. The federal government assists by providing a coordinator, clerk, and, as requested, a community development specialist and technical personnel, such as foresters and engineers.

The RC & D concept starts with the recognition of area and community problems by local people. It is not an agency or a "top-down" program; therefore, its flexibility allows it to operate as a political force. Because local citizens retain the responsibility for initiative and action, the program expands or stagnates in conjunction with the interest and activity of those citizens.[13]

The late Hugh D. Galusha pointed out some of the pitfalls of community development when practiced with ideas and control coming from

[6] *Ibid.*, pp. 60-76.

[7] *Ibid.*, p. 324.

[8] Allen Bjergo, "Community Development," unpublished paper for the Bitter Root RC & D Project, Hamilton, Montana, 1972.

[9] Warren, *The Community in America*, p. 310.

[10] Wiledon, *Community Development*, p. 118.

[11] *Ibid.*, p. 79.

[12] William R. Lassey and Anne S. Williams, *Community Development in Montana* (Bozeman: Big Sky Books, Montana State University, 1970), p. 38.

[13] Bitter Root RC & D Program Committee, "Principles of RC & D Projects" (Hamilton, 1966).

sources external to the community.[14] Programs such as those developed within RC & D organizations strive to avoid such traps and instead try to strengthen the ability of communities to draw upon their own strengths and skills. They feel, like Galusha, that waiting for "lightning to strike" in the form of some externally controlled development is not the answer.

There are more than one hundred RC & D projects in the United States, some in the application stage, but most in operation, ranging from two to eleven counties in size and nearly covering some states, such as South Dakota and Colorado.

In the Bitterroot, the project started when the Bitter Root and Missoula Soil and Water Conservation District supervisors read details of the provisions for such a project. They passed over the idea in 1963, but revived interest in 1964 when individual citizens in Ravalli and Missoula counties began discussing problems both counties were facing. The supervisors, all local citizens elected from the areas in which they live, began to write an application. Supervisors are to provide guidance to Soil Conservation Service personnel in each county, and in this case, the supervisors called on personnel from several agencies (the Extension Service and Soil Conservation Service, for example) to assist in applying for project status.

Individual farmers then visited more than forty groups in Ravalli and Missoula counties and received from each an agreement to support application for project status. The application outlined the characteristics of the area, its history, problems, and opportunities. Each group listed the problems and opportunities they saw, and the long lists were consolidated to form the heart of the work plan. The project began in 1966, and in 1971 Mineral County and the remainder of Missoula County were included to expand the Bitter Root RC & D Project to three full counties, Granite County, on the east boundary of the present project, also applied to join in 1971, but the application has not received the required approval of the Governor of Montana, probably because Granite County lies in a state planning district different from Missoula, Mineral, and Ravalli counties.[15]

In discussing community development for the area, Clarence Popham, the first Bitter Root RC & D chairman said: "For us to sit back and wait for development to happen by itself, for industry and government agencies to be allowed to determine how we live and what we look at, is not a necessity, it is what happens when people don't care."[16]

This statement referred to one of the most controversial proposals to be submitted to the committees of the RC & D Project: number 168, which called for an investigation of public land management policies. The investigation was proposed by five local citizens who were concerned about clear-cutting on national forest lands. Their proposal was vilified by some, ignored by others, and attempts were made to reject it. But in the statement which included the quotation above, the chairman also explained that no proposal can be rejected, it can only be withdrawn by the original proponent.

As a result, a task force investigation by the Forest Service, and a Congressional investigation took place. Meetings of RC & D committees attracted up to 500 people, with charges and countercharges hurled among industry, conservation, and other groups. However, the proposal was not allowed to die; the concern in fact led to a nationwide re-evaluation of management policies. Citizens who felt they had no power to make change have since used the growing political leverage of this citizen group to go over the heads of nearby agency officials to get in direct contact with Congressional delegates, and high government officials.

One outcome of proposal 168 has been the increased dialogue among opposing groups. They have found areas of common interest and are currently making a cooperative effort to offset reduced timber sales by calling for increased funds to perform needed silvicultural and clean-up work on the forests.

Supervising the project is an overall program committee which meets periodically to set policy for the three-county area. Each county has a program committee, under which are resource committees, which concentrate on special areas

[14]Hugh D. Galusha, "The Myth of Community Development," *Montana Business Quarterly* (Missoula: Bureau of Business and Economic Research, University of Montana, Winter-Spring 1969), pp. 26-31.

[15]Application and correspondence of the Bitter Root RC & Project, Hamilton, Montana.

[16]Clarence Popham, "Report to the RC & D Program Committee" (Hamilton, 1969).

of interest including urban problems, cultural improvements, recreation, agriculture, industry, education, and others. Any citizen becomes part of a resource committee by attending meetings or submitting a proposal. There are no dues or formal membership lists.

Of the 369 proposals received as of May 1972, 136 have been completed, 116 are in progress, and 117 have become inactive or were unfeasible.[17]

Some examples of proposals which were completed, or not completed, provide insight into how this form of community development works. In one case, a group of people in and around Stevensville wished to write and publish a history of the community. They submitted a proposal asking for assistance in financing and in writing the book. The money was eventually provided by a loan to those involved; an inmate of the county jail—a typist and capable editor—typed the manuscript and assembled the book. The sales of *Montana Genesis* have since repaid the loan, the typist is out of confinement and working in a program to assist other exconvicts, and thousands of people have read the book. Several groups have revived their interest in area history and in developing museums and more books.

Concurrent with development of the Stevensville book, Dr. William Jellison submitted a proposal calling for assistance in renovating the former Rocky Mountain Tick Fever Laboratory into a museum. Largely through his efforts, the Ricketts Memorial Museum, named for the doctor who discovered the cause of tick fever, has been developed and is now on the register of national historical landmarks.

Agricultural projects constitute a substantial number of the total proposals, including several to implement gravity flow irrigation systems. These systems take water from a supply canal flowing on benchlands above the ranches and carry water in large mains to each unit where sprinkler systems may be connected for watering individual fields. There is sufficient fall to generate the pressure for sprinkling, with little use of electric power, and the systems provide much more efficient use of irrigation water.

A number of neighborhood groups of ranchers began investigating such systems and found that when enough neighbors banded together to incorporate for such a system, federal cost-sharing would pay half the cost, with the remaining money available under long-term loans. The cost to the rancher would be $100 to $150 per acre. After countless neighborhood meetings, all the details were completed and several such projects constructed. In one case, a rancher reported that a field which had less than 20 acres of usable ground under flood irrigation was expanded to 26 acres when ditches were filled in, gullies eliminated, and dry edges brought under sprinkler irrigation. In nearly all cases, ranchers reported increased yields and lower irrigating costs.

In cases of completed proposals, the group assuming the obligations carried on nearly all of the organizational work and much of the physical effort. They were made aware of technical and financial assistance. When they encountered obstacles which required technical aid, publicity, or political force, the group working on a proposal would go back to the RC & D committee for further assistance.

Day-to-day communications among those most vitally interested in a proposal are imperative to carry it forward. Progress reports on each proposal are given at the monthly meetings of the resource committee to which it was assigned by the chairman of the program committee in each county. Each resource committee chairman, in turn, appears at the county program committee meeting and makes a brief report on each month's activities.

Approximately half of the proposals are submitted by private persons for personal gain. One example was a Stevensville butcher who liked working with plastics. After his son had been lost overnight on a hunting trip, he devised a plastic belt-mounted emergency kit. He wanted to manufacture such a kit, but was unable to obtain financing, technical help, and marketing assistance. After submitting his problem as an RC & D proposal, the publicity and interest enabled him to obtain a loan at a local bank, and technical assistance was offered. His emergency kit was described in a column in a world-wide trade magazine and he was able to manufacture the kits and find outlets in nearly all states and in many foreign countries. The business now manufactures a wide variety of plastic items and employs a half-dozen people. The owner became interested in the activities of the Industry-Forestry Committee and served as chairman for two years.

[17]Bitter Root RC & D Program Committee, "Annual Report, Fiscal 1972," unpublished data (Hamilton, 1972).

His son, who was able to remain in Montana working in the business instead of seeking out-of-state employment, also served as chairman of the Committee. The whole family now finds less time to be active in committee meetings, but has developed a series of friendships with other committee members, creating a web of mutually supporting services within the community.

The Industry-Forestry Committee has developed a rather different philosophy regarding industry in the project area. Since out-of-state industries are nearly impossible to attract, the Committee has concentrated on helping individuals and families elevate evening and weekend backyard hobbies to full-fledged industries, employing local citizens. University of Montana Business School faculty have assisted in this effort since 1966.

Two disabled men, for example, have been assisted in starting production of stakes, lathes, fruit boxes, and wooden jewelry. Another has begun production of campers and portable buildings, employing thirteen men who previously were unemployed. A small furniture factory and a producer of survey stakes have worked with the committee to expand their production. Several producers of posts and poles have been helped to manufacture for a market which is rapidly expanding. In all cases, RC & D committee members have helped local people use local raw materials to start new, small industries.

Presently, a series of proposals for other parts of the region are in progress, after several neighborhood groups became concerned about the need for planning in the three counties. A proposal for assistance in planning came after a rapid increase in population in the Six Mile and Nine Mile areas west of Missoula. In swift succession, groups in other rapidly developing portions of Missoula and Ravalli Counties submitted requests for assistance. Cross-ties were developed with the emerging nine-county Regional Planning Association of Western Montana, allowing officers in the RC & D Project to serve with this group in their capacities as mayors and county commissioners. Technical assistance, such as aerial photography, was made available and the services of the University system were tied in where skills in the fields of geology, biology, business, and water resources were needed.

Citizen pressure in Ravalli County led to adoption of county-wide planning, with additional neighborhoods organizing to carry out planning for the areas they know best—their own back yards. Allied proposals have included one to create Five Valleys Park in Missoula, another to recycle garbage in counties west of the Continental Divide, and others to deal with the garbage, recreation, sewage, and water problems of individual communities. A further example of cooperation over a wide area is the effort to establish a farmers' market in Missoula, starting with a proposal to the Missoula Program Committee and later involving the whole project area in reaching potential producers of fruit and vegetables for the market.

Of course, there are always ideas that don't work out. In some cases, the proponent may die or move away. In others, the timing was off. One example is a gravity flow sprinkler irrigation system planned for several ranches in the Corvallis area. Two ranchers felt the need most strongly, since their electrically operated systems were plagued with infusions of fine sand. They began to organize as several other such groups had done, but when it became necessary to have a positive commitment, most of the neighbors refused to participate.

The reasons were varied; some owners had not felt the same need as the two innovators; some ranchers could "get by" with flood irrigation; others were considering selling or were too old to want to engage in further investment. When the time came to begin signing documents, the two original proponents found themselves the only persons with sufficient commitment to the proposal and they could not afford to carry it on alone.

All of the other gravity flow systems which were completed appeared to encounter from one to several years of delay until all potential participants were sufficiently motivated to join in the effort of obtaining such a system. In some cases, more than half of the ownerships changed hands before the proposal could succeed.

Two proposals which failed for a time and were revived in 1972 concern the building of community meeting facilities. In Clinton, east of Missoula, and in Hamilton, the need for suitable meeting space caused citizens to organize several years ago. In Hamilton, the proposal reached a stage in which the 4-H Club, senior citizens, Headstart, and other local groups agreed to sponsor and share a building. An architectural department class from Montana State University traveled to Hamilton on several occasions and

developed a design agreeable to most of the interested groups.

The Trapper Creek Job Corps Center agreed to erect the building and it was then up to local groups to raise approximately $25,000 for the two-story octagonal building—in combination with twice that amount in contributed material and labor. At the last moment the sponsoring group felt it could not assume such a responsibility and the proposal lay dormant until a youth subcommittee revived the idea early in 1972.

In Clinton, there was a similar flurry of organization and a period of interest, after which the idea became dormant until one member of a local woman's organization revived the idea and obtained a building, the services of a moving contractor, and the support of the community.

In some cases, inventors have developed ideas to the stage where the concept was submitted as a proposal. Lack of financing stopped several, but in a few cases, the proponent "panicked" and fear of publicity or "having his invention stolen" stopped any further progress.

After extended study, some proposals, such as one to erect and operate a vegetable freezing plant, simply turned out to be economically unfeasible.

Observations

The basis of community development is the ability of people to work together. Starting with kinship groups in prehistoric times, mankind has developed means of organizing formally and informally to achieve goals. Within such organizations power structures develop—either visible positions of power related to elected office and positions of influence, or a hidden power structure in which possession of property and influence becomes the "power behind the throne."[18]

One problem community development groups frequently encounter is that a large percentage of the visible or hidden power structures does not cooperate. Some researchers feel this results from the threat posed by any new grouping of humans to those already in positions of power.[19] To a degree, this is true in the Bitter Root RC & D Project. But some of the most active participants are ascending in the power structures of schools, churches, or other community organizations to which they belong. They are innovative and, at times, intolerant of resistance by more established leadership. The strongest criticisms of RC & D participants or the organizations within the project surface when conflicting interests appear threatened. It is often difficult for persons or organizations attempting to guard their flanks against threats to understand that, as with most community development groups, the RC & D committees are collections of citizens with a wide range of interests and opinions, and that concensus or unity of action is not always necessary for a proposal to become successful. Proposals are flexible and frequently undergo marked changes as they develop.

The wide variation in attendance at RC & D meetings prompted this author to make a study of committee attendance, and later, of the most active individuals in four resource committees. It was possible to identify several degrees of interest and commitment among those attending committee meetings over a four-year period. These studies found that at any given time only about four persons were really active on each of the committees, with many other active members appearing only when some proposal touched their specific interests.

The people who were most active often were not members of the local power structure, but rather tended to be "gadflies" in the sense that they had ways of applying pressure to local, state, and national figures, often behind the scenes.

About half of the most active members of the committees studied were financially independent: they were retired or had independent incomes. They were under little pressure to conform to community norms through fear of losing business, a job, or sources of credit.

Studies indicate that only from 1 to 3 percent of the total adult population at any one time is actively engaged in voluntary community action and decision making.[20] There are other signs that any organization goes through a series of stages in which interest peaks, then wanes until the group becomes dormant or a new situation creates a second or subsequent peak of interest. Young people's groups appear to have the

[18]Wiledon, *Community Development*, pp. 171-84.

[19]Clyde Jarvis, *Priorities for People* (Great Falls: Montana Farmers Union, 1969), p. 44.

[20] Bjergo, "Community Development," p. 2.

shortest life span and business improvement organizations the longest-lived. Professional help, as in the RC & D Project, should also be regarded as a factor in maintaining longer life cycles in organizations.[21]

Recruitment and training of new leaders to replace those who leave the organization is especially important, particularly since the evidence shows that a small percentage of citizen members keep active and informed between crises or when proposals are largely dormant. This appears no less important in the Bitter Root RC & D Project than in other community development groups, since there was ample evidence that when an individual had achieved his objectives through active participation in the project, he would likely become less active.[22]

The professional staff assisting the community development effort must maintain a delicate balance between helping the leaders discern the problems which the organization must face, yet they should not carry so much of the responsibility for organizing, recruiting, and group maintenance that the community development organization will falter when the professionals are transferred or retired. The role of the civil servant in the Bitter Root RC & D Project has been defined through program committee policy over the life of the organization: the role of agencies and individual civil servants should be to bring skills and contacts within the reach of local citizens, while making sure, however, that agencies and professionals must not dominate the program. Individual civil servants not directly assigned in community development may act as local citizens outside their professional field, but the Project has found it advisable to keep offices and power in the hands of local citizens and require civil servants to assume a "low profile."

In part, this is necessary because civil servants, teachers, ministers, and even local officials are subject to transfer or removal from office. The failure of earlier community development efforts in Montana has been in part attributed to the loss of momentum which occurred when leaders who were part of a church, school, or agency moved away and the program stagnated without them.[23]

In its relations with agencies such as the Soil Conservation Service, the Extension Service, and the Forest Service, the RC & D organization has at times found them reluctant to assume what was considered an appropriate role in community development. In some cases, strong leadership has been needed to alter the attitudes of such agencies. Industry, too, has at times so dominated local people that in some cases the population has not developed the decision-making skills needed to guide its own destiny.[24]

Active and interested local citizens must be at the heart of any community development program, as they are in the Bitter Root RC & D. Daily activity and leg work must take place on the part of interested individuals or in small well-acquainted and informal groups.

Community development is as old as mankind itself. It is an activity of people which binds them more closely, improves their lives, and ensures the preservation of culture, spirit, and environment. Successful community development—the prime goal of the Bitter Root Resource Conservation and Development Project—allows each individual to build the fullest range of self-development and personal expression within a warm, concerned, and fulfilling community.

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[21]Wiledon, *Community Development*, pp. 32-33.

[22]Bjergo, "Community Development," p. 4.

[23]Popham, "Report to the RC & D Program Committee," p. 2.

[24]K. Ross Toole, "The Changing Winds of Montana," *Montana Business Quarterly* (Missoula: Bureau of Business and Economic Research, University of Montana, Winter-Spring 1969), p. 8.

R. THOMAS DUNDAS

A Graphic Tool for Data Analysis

Computer maps as a new way to see statistics

Statistical data, by its very nature, is often hard to use, to analyze, to visualize. The goal of the Information Systems Division of the State Department of Planning is to help Montana agencies and individuals to understand and make use of such data. A new mapping system which translates data into graphic maps of Montana makes this now possible to a greater degree. Existing maps cover such data as outmigration, population growth, and per capita income.

In 1969 the U.S. Bureau of the Census designated the Information Systems Division of the State Department of Planning and Economic Development as the agency in Montana to handle and process data from the 1970 Census. As a 1970 Census Summary Tape Processing Center, this division serves all users of census data by providing Montana census information, tabulations, and analytical reports of data contained in the census magnetic tapes.

Computer Graphics

Maps which show geographic information, such as state and country data, can be most helpful in visualizing and evaluating information. To answer the need for such maps, we developed the computer mapping program for display of data. The system called GRAMP, Gary Rogers Automated Map Program, was named after our systems analyst who wrote the program. The maps produced by the program contain an outline of the state and each county with the county name and a single numeric value for the characteristic being mapped. Any data tabulated by Montana's counties can now be used as input into the program to produce a map displaying that same data.

The counties are also shaded by value of the characteristic in a quartile format. In this format the data are grouped into four classes (quartiles) with each quartile having its own symbol or shade. The first or highest quartile is portrayed by an almost black symbol (■), the second quartile is identified by an X in a box (⊠), the third quartile has as a symbol an asterisk (*), and the fourth or lowest quartile is represented by a series of dashes (--).

Visual Correlation

Exhibits 1 and 2 are typical maps illustrating Montana's population change and migration from 1960 to 1970 as a percentage of the 1960 population. From exhibit 1 several conditions can be quickly seen. Although Montana increased 2.9 percent in total population from 1960 to 1970, 41 of Montana's 56 counties lost population; counties east of the Rockies experienced most of the loss. One also observes that of the 15 counties gaining population, all but 5 are located in western Montana. The greatest population loss, 32.8 percent, was in Valley County and the highest population increase, 44.1 percent, was in Lincoln County.

Exhibit 2 shows the effect of Montana's outmigration of 8.6 percent, a loss of 58,000 people from 1960 to 1970. Of our counties, 48 show an outmigration. Again Valley County had the highest outmigration, 56.6 percent or 9,672 people,

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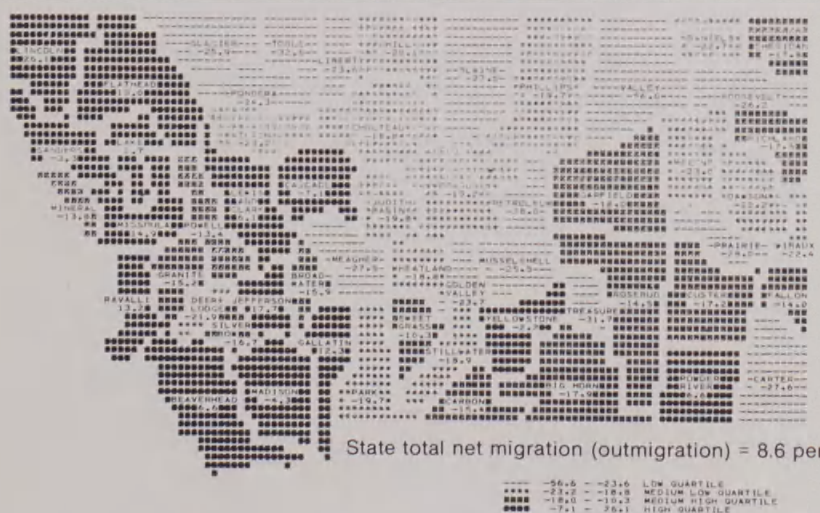
Exhibit 1

Population Changes in Montana Counties, 1960 to 1970 as a Percentage of 1960 Population

Source: Montana Department of Planning and Economic Development, State Information System (Helena, Montana, 1972), citing U.S. Department of Commerce, Bureau of the Census, *U. S. Census of Population and Housing: 1970, General Demographic Trends for Metropolitan Areas, 1960 to 1970, Montana*, PHC(2)-28 (Washington, D.C.: U.S. Government Printing Office, 1971), table 3, pp. 28-10 and 28-11.

Exhibit 2

Net Migration to and from Montana Counties, 1960 to 1970 as a Percentage of 1960 Population



Source: Montana Department of Planning and Economic Development, State Information System (Helena, Montana, 1972), citing U.S. Department of Commerce, Bureau of the Census, *U. S. Census of Population and Housing: 1970, General Demographic Trends for Metropolitan Areas, 1960 to 1970, Montana*, PHC(2)-28 (Washington, D.C.: U.S. Government Printing Office, 1971), table 3, pp. 28-10 and 28-11.

and Lincoln County had the greatest percentage inmigration, 26.1 percent or 3,278 persons. Comparisons of exhibits 1 and 2 show a strong correlation between the data. Those counties in the upper quartile of the population change map are generally the same counties with an inmigration and the counties in the lowest quartile are generally the ones with high outmigration.

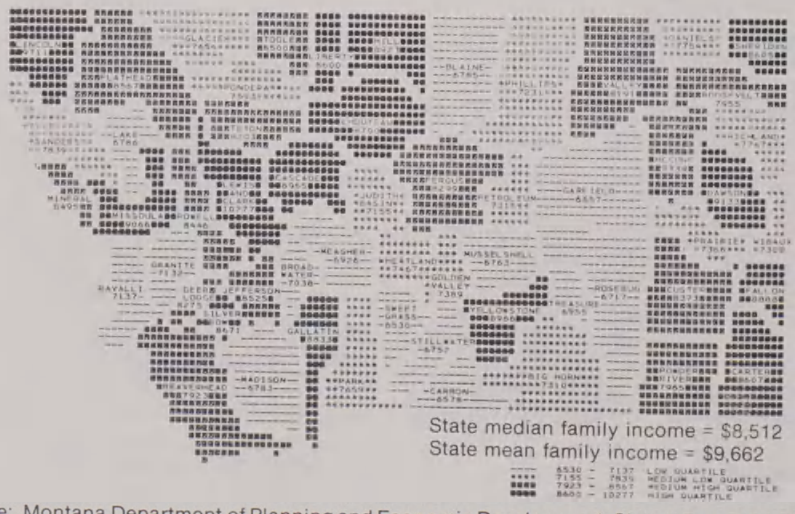
Another interesting comparison becomes visible when income data are translated to map form. Exhibits 3 and 4 illustrate median family income and per capita income taken from the 1970 Census. By comparing these examples, we can see that generally the counties with a high per capita income have a high median income. The large population counties, Cascade, Yellowstone, and Missoula, as would be expected, are in the upper quartile; Lincoln County because of dam construction; Lewis and Clark County because of federal and state government. A number of counties with an agricultural economic base, such as Chouteau, Liberty, Sheridan, and Carter, are likewise in the upper quartile.

Counties with income in the lowest quartile on a per capita basis are most frequently in the low quartile or next to the low quartile on the median family income map. However, an interesting anomaly occurs in Madison County. Madison County has the third highest per capita income in Montana. Based upon a high degree of correlation between per capita income and median income one would expect to find Madison County's median income also in the highest quartile; however, it falls in the lowest quartile. This is further verified by exhibit 5 which shows the percentage of families in Montana counties with incomes below the poverty level. This map shows Madison County's level of poverty is in the highest quartile, with 15.6 percent of all families below the poverty level.

The paradox of why a county has one of the highest per capita incomes and still has a low median family income is resolved by looking further into income data of the 1970 Census of Montana's total families. Approximately 0.5 percent, or 912 families, in Montana have an income of $50,000 or greater. Of these, 33 families, or 2.5 percent, of all Madison County families are in this income range. The impact of a relatively few families of high income in a small county is great enough to raise the per capita income of the entire population to the highest quartile in the state.

Exhibit 3

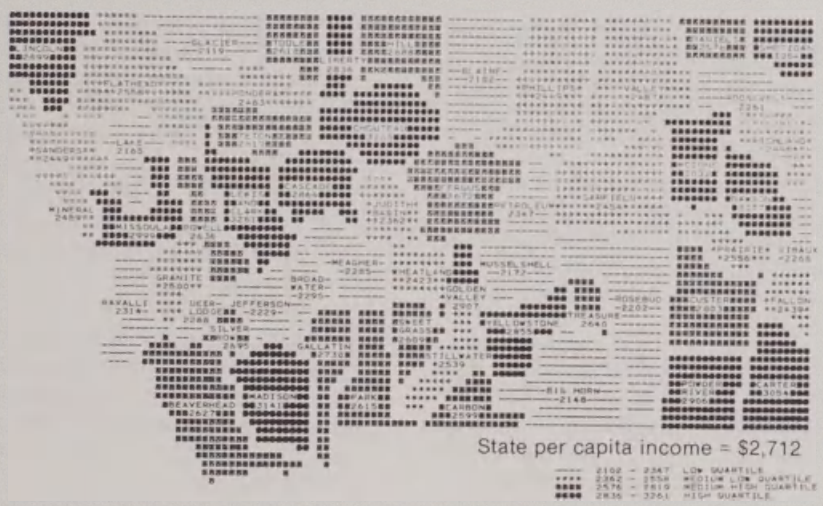
Median Family Incomes in Montana Counties, 1969



Source: Montana Department of Planning and Economic Development, State Information System (Helena, Montana, 1972), citing U.S. Department of Commerce, Bureau of the Census, *U.S. Census of Population: 1970, General Social and Economic Characteristics, Montana*, PC(1)-C28 (Washington, D.C.: U.S. Government Printing Office, 1971), table 124, pp. 28-221 to 28-225.

Exhibit 4

Per Capita Income in Montana Counties, 1969



Source: Montana Department of Planning and Economic Development, State Information System (Helena, Montana, 1972), citing U.S. Department of Commerce, Bureau of the Census, *U.S. Census of Population: 1970, General Social and Economic Characteristics, Montana*, PC(1)-C28 (Washington, D.C.: U.S. Government Printing Office, 1971), table 124, pp. 28-221 to 28-225.

Exhibit 5

Percentage of All Families in Montana Counties with Incomes Below Poverty Level in 1969

Source: Montana Department of Planning and Economic Development, State Information System (Helena, Montana, 1972), citing U.S. Department of Commerce, Bureau of the Census, *U.S. Census of Population: 1970, General Social and Economic Characteristics, Montana*, PC(1)-C28 (Washington, D.C.: U.S. Government Printing Office, 1971), table 124, pp. 28-221 to 28-225.

Thus in Madison County the correlation between median and per capita income is inverse rather than positive.

The use of statistical data in map form also allows the analyst to relate that data visually to other geographic data and to subsequently identify strong or weak correlations which are not so easily identified in tabular form.

The GRAMP program has been used on a wide range of subject data: housing, health, crime, law enforcement, personal income, migration, poverty, and unemployment information. The program is also used by other state agencies to display their particular data.

In addition to the GRAMP program, the Department of Planning is developing other mapping programs to assist planners, statisticians, and analysts. These are the Plotter Mapping Program (PMS) and the Composite Mapping System (CMS). The PMS program is used to store and map physical land features such as contours, soil types, surface water, ground water, flood plains, agricultural uses, and ownerships for easy access. Virtually any type of physical land use can be mapped this way. As a prototype for test purposes we are using a 6 x 10 mile area of the Helena Valley.

The third mapping program, CMS, has been developed by the Economic Development Administration, a division of the U.S. Department of Commerce. The Department of Planning will convert this computer program for state use later this year. This program provides similarities to the GRAMP program, in not only mapping individual characteristics, but also in its ability to stack these characteristics as composites. This system is currently being tested by the Four Corners Regional Commission in the states of Utah, Colorado, Arizona, and New Mexico.

In mapping a wide variety of data for various user groups, it is becoming more evident that printer mapping programs such as GRAMPS and CMS appear to be better suited for regional and state analysis, while plotter mapping systems such as PMS are best suited for local area analysis and planning. The Helena City-County Planning Department is currently using PMS maps to assist in examination of problems in the Helena Valley, while a wide number of other users are using the GRAMP program to examine county information.

Like other services from the Information Systems Division of the Department of Planning, the maps and mapping programs are available to other state agencies and local government users, frequently at no cost. But the real future of the mapping programs depends upon the reactions of the users. Since the programs are still new, it is difficult to predict all the potential uses or even the refinements that will make the systems more valuable. But the Department does stand ready to present the statistical data in the most useful graphic means.

LUCILLE W. THOMPSON

Early Montana Negro Pioneers: Sung and Unsung

Brief accounts of some Black pioneers

The stories of "how the West was won" fill many volumes and excite even the casual reader. Extensive studies have been made about the westward movement and its significance in relation to the whole picture of American history.

In my attempt to write about Negroes in the early days of Montana's history I soon found that to try to relive some of the excitement of those days was difficult because so much of this history seems never to have found its way into print.

It is true that in relation to the whole exploration of the West the number of Negroes who took part was relatively small. But it is also true that those Negro settlers who participated in the settling of the American West endured the same hardships, faced hostile Indians, went without adequate food, lost members of their families just as other settlers had done. But for a few fragmentary references to their part during these times, many of their songs are unsung.

The names of York, probably the first Negro to set foot in Montana, Jim Beckwourth, the famous mountain man, and Isaiah Dorman, Custer's Negro interpreter, are known to many readers. But this list can be lengthened if we look into our local histories.

I think we can discover quickly that Negro settlers came west for the same reasons other settlers had come. Some sought freedom and fortune; some found their way west as members of the United States military forces; some homesteaded and farmed; some joined the bands of cowboys on the long cattle drives; some mined for gold; and others worked as maids, coachmen, or laborers. There was much to be done in the new frontier and all settlers were a part of its history and answered the call for strong men.

When I turned to the *U.S. Census of Population* to find meaningful statistics about early day Negroes and where they came from and why, where they lived, how they lived, and what kinds of jobs they had, I found the stark information severely limited. It wasn't hard to find that in the territory of Montana the 1870 Census reports 180 Negroes; the 1880 Census reports 340 Negroes; and the 1890 Census reports 1,490 Negroes in the state of Montana; 1,523 Negroes were reported in 1900 and 1,834 Negroes in 1910. But when I turned to check occupations by age, sex, and nativity in the 1880 Census, I discovered that nativity meant from which country one had come (Ireland, Sweden, Great Britain): the nativity tables made absolutely no reference to race. I learned that there was one separate school for "colored" children reported in the 1880 statistics, but in the 1870 Census sometimes colored meant Negro, and sometimes Indian, and a few inconsequential tables distinguished Colored (Blacks) and Colored (Mulattoes).

I subsequently turned in a random fashion to the Bozeman city directory of 1892-93 to see if it offered information which might indicate kinds of jobs Negro settlers held. There I discovered meager but descriptive facts. Entries were as follows:

> McDonald, Dick, (col'd), lab(orer), e s 2nd av sw, 2 s 3d st, date of set '64, for(mer) res(ident) Mo.
>
> Barnes, G.B., (col'd), lab(orer), e s 1st av nw., 1 n 5th st, native.

Mrs. Lucille W. Thompson is Head Reference Librarian at Montana State University in Bozeman. She received her undergraduate degree from Talladega College in Alabama and her graduate degree in Library Science from the University of Washington, Seattle. Mrs. Thompson was born in Lewistown and grew up in Great Falls.

Anderson, John, (col'd), lab(orer), n s 1 st s w, 1 w Boz av, date of set '66, for(mer) res(ident) Ind(ian) ter(ritory).

Obviously the development of the new land would not have been possible had not each person pushed forward over the rough, primitive plains and mountains bringing with him any talent he had. The experiences of some Black pioneers show this. Their names may be new to you but their lives speak for others who had similar experiences.

Several of these early pioneers had been born in slavery. When they came into Montana Territory some came with their masters and remained in their employ after slavery was abolished. Some of those who came into the new territory came as free men and worked at many trades.

There are few statistics to indicate from which states early Black settlers came, but their stories show they came from many parts of eastern and southern states. Some came as children, grew up with the new land, and took up work of many sorts.

An account of the life of "Smoky" Wilson relates that Wilson had come to Montana Territory in 1866 as a ten-year-old boy. He came with the Louis Howell (Houles?) family. He had been born in Missouri. The trip from St. Louis was made on the steamer *E.C. Stoddard*, a stern-wheel boat. When the boat hit a snag at the mouth of the Milk River and subsequently sank, the party on board got off safely and were brought into Helena in a trader's outfit owned by Nelson Story.

At Bozeman, the boy Wilson worked as a stable boy for a livery man, learning chores which included greasing harnesses and washing buggies.

When the Howell family moved to California, young Charles remained in Bozeman working with some of Nelson Story's outfits and learning to break horses and ride the range. The Story range was close to Crow territory. Eventually Wilson went to live with the Crow Indians. He traveled with them, learned their language, and was soon accepted as one of them. When the Crows came to Fort Ellis, army officers called upon Wilson to act as interpreter. Later when Fort Custer was built in 1877, Wilson served as a field interpreter until the Fort was abolished. For a time Wilson worked for the Indian service as an interpreter and in later years served as a policeman at the Crow Agency. His personal experiences were so vividly told to persons who knew and respected him that they remain legendary.

Maria Adams Dutriuieille came to Montana by river steamboat. Maria was born in 1852 in Kentucky. In 1871 she traveled aboard the river packet *Big Eagle* to Louisville, where she lived for a few years.

Her sister, Mary, was employed as a cook for General Custer at Fort Lincoln, and in 1875 Mary sent for Maria to take a job as housemaid in the Custer quarters. Maria Adams traveled from Louisville to St. Paul by train, from there to Bismarck and Fort Lincoln. At that time there were 600 persons at the Fort.

Maria Adams watched the Seventh Cavalry ride westward, never to return. When the annihilation of Custer's command became known, many at the Fort returned to their homes or left for other parts of the country.

Mary and Maria moved about the Northwest; in 1881 Mary died, and Maria married Duke Dutriuielle at Helena. After the wedding they lived in Marysville, Fort Benton, and Helena. Dutriuielle operated a barber shop known as "Duke's Place" in each of these towns. After living in Helena seventeen years, the Dutriuielles moved to Belt during the coal boom.

Following her husband's death in 1911, Maria moved to Great Falls, which at that time was only six or seven years old, where she resided with her daughter until her death in 1939.

Some Negro pioneers homesteaded the land and ranched. Becky Anderson who is still alive today recalls early Lincoln and Helena. She first came to Lincoln about sixty-seven years ago and remembers that Lincoln had only a hotel and post office. Mrs. Anderson's mother, Mrs. Alice Palmer, had been coming to Lincoln from their home in Helena since 1904. The cabin in which Mrs. Anderson still spends some of her summers was the first furnished cabin rented in the valley. Mrs. Anderson further recalls that her mother built twenty-two cabins in what is now known as the Palmer subdivision. Mrs. Palmer had been born in Kentucky and was ten years old when freedom was declared. She was the first Negro in Lewis and Clark County to homestead property, and that was in the Lincoln country. After her husband's death when her children were young, Mrs. Palmer raised her five daughters and one son in Helena.

In the early days Mrs. Anderson enjoyed seeing

the large herds of cattle driven through the canyon to Helmsville. Another memory Mrs. Anderson recalls is the camping trips her mother took the family on every summer; especially memorable was the trip to Yellowstone National Park in 1906.

Mrs. Anderson and her husband now live in Los Angeles, but they are still welcome visitors to their beloved Lincoln country.

Vindia and George Smith ranched near Flood, Montana, for several years before moving to Great Falls in 1892. Mrs. Smith had been born in Springfield, Tennessee, in 1861 and had come to Fort Benton by river boat in the 1880s. One of their sons still makes his home on their ranch situated along the Missouri River.

Other early Negro pioneers had come to Montana in the service of their country. The Tenth Cavalry was the most famous unit of Negro soldiers. For many years it served on the frontier, but it also saw action in the Spanish-American War. General John J. Pershing was one of the many high officers to serve with the Tenth Cavalry when fresh from West Point.

Although the Tenth Cavalry was officered by whites, some of its Black noncommissioned officers were commissioned at different times, particularly during World War I. Among these was Captain Horace W. Bivins of Billings, who was formerly quartermaster sergeant in the Tenth Cavalry.

Lem Lucas, born in Ross County in 1866, had spent his early childhood in Ohio, enlisted in the army, and was sent to Montana where he served at Fort Assiniboine for many years. His father was a clock and watch repairer and basketmaker.

In 1892 Lem with several of his companions enlisted in the army at Dayton, Ohio, to serve as frontiersmen in Montana. They came by train to Havre and to the Fort by stage. Mr. Lucas did general work and guard duty in the Tenth Cavalry under Captain Bigelow. One duty was to escort displaced Indians into Canada and see that white people were not molested. There were no trains running from Havre to Great Falls then, and the soldiers also had to guard the stagecoaches through that part of the country.

While on duty the soldiers fought many prairie fires. One of their methods was to fasten a long chain between two horses, wrap the chain with wet gunny sacks, and let the horses drag the sacks through the fire extinguishing it wherever the chain touched.

When he completed his tour of duty, Mr. Lucas lived in Fort Benton and later in Great Falls, where he was employed at the Great Northern freight office from 1912 until his retirement.

James Snowden was another member of the Tenth Cavalry. He first enlisted in Detroit in 1873. In addition to his work as a soldier, Mr. Snowden sometimes also served as a scout. At one time his troop met the Northern Cheyenne and was under fire for eight hours. Mr. Snowden, who had been born in Williamsport, Pennsylvania, was believed to be close to one hundred years of age when he died in 1934 in Miles City.

The mine fields atrracted some Negro pioneers. H. Porter Grove was born a slave, just when or where he never knew, but it was probably in Mississippi or Alabama about 1851. The war set him free and he worked his way north, for some years living around St. Louis. Sometime later in the 1870s he came to Montana and began a checkered mining career. He went to Radersburg and there located several mining claims from which he took a little money. He went East to sell mining stocks to others of his race. His wealth faded when the mines failed to produce and he had blown his stockholders' money. The *Helena Independent* of January 11, 1911, carried the following captions:

H. PORTER GROVE DIES A PAUPER
ONE TIME MILLIONAIRE, NEGRO FROZEN TO DEATH NEAR RADERSBURG

Some early Negro pioneers rode as cowboys, living through the long drives from Kansas and Texas to Montana Territory. Many collected their pay at the end of the trail and headed back south. William Haywood was a cowboy who remained in Montana. Affectionately called Wild Bill Haywood, he had come from Virginia as a young man and settled in Great Falls. With other children in the neighborhood, I spent many hours listening to his reminiscences. We never knew how much was fact and how much was fiction, but all the tales were spellbinding.

The stories were accompanied by dramatic pantomimes of the action, and he would often break into song with, "She ripped and she tore, she cursed and she swore, in the days of '49."

One day Bill told us about an experience he had when he was living alone in a remote cabin. One night he heard someone rattling the door. He called out, but the intruder didn't answer. He

called out twice more and still there was no answer. So Bill shot through the door with his "44" and there was no more noise. Bill said, "I went back to bed and went to sleep. Next morning I opened the door. There was the would-be intruder—deader'n a doornail." He threw the man into the wagon, hitched up the horses, and deposited his nocturnal visitor with the sheriff.

Old Bill's tales grew more inspired the more he drank. Once he told us that he used to shoot rats off his big toe with his "44." Bill was in his 80s when he died in 1936.

These briefly told accounts are only examples of others that could crowd the history books about early Negro settlers in the West, and particularly Montana. It is hoped that the histories of early Negro men and women can be gathered and made available in the Montana Historical Society so that the public may study and enjoy them.

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"Woman Who Served Custer at Fort Lincoln Dies Here," *Great Falls Tribune* (May 2, 1939), p. 12.

JAMES M. EDWARDS

The Problem of Newsprint Disposal

What can we do with Montana's wastepaper?

Introduction

The problems of solid waste disposal are becoming more acute in many areas. Present expensive methods of incineration pollute the air; sanitary landfills are becoming full and rodent-infested. Cities across the nation looking for new and improved methods of mitigating the problems of solid waste disposal find recycling the best answer, since recycling treats waste as a raw material to be used over and over again, and thus preserves our natural resources.

Because paper and paperboard represent the largest portion of household and commercial trash, obviously the first effort should be directed toward removing them from the main waste stream. Furthermore, half of that paper refuse consists of waste newsprint which, unlike other wastepaper, is easily identifiable and can be separated from household trash for reuse.

This article will provide factual information on the feasibility of mitigating Montana's solid waste disposal problem through the reduction of wastepaper—especially used newspapers. Its scope covers the wastepaper generated in Montana, with primary emphasis on the Missoula area and considers the feasibility of newsprint recycling, as well as other market possibilities.

In order that the reader may readily relate to some of the data presented in this report, table 1 is included here to show the 1971 circulation and newsprint consumption of principal Montana newspapers.

Table 1

Estimated Circulation and Newsprint Consumption Montana Newspapers, 1971

Newspaper	Circulation	Consumption of Newsprint (Tons)
The Missoulian	27,217	1,702
Billings Gazette	54,500	4,252
The Montana Standard	23,013	1,216
Independent Record	9,998	553
Great Falls Tribune	43,500	3,260
Other Montana Newspapers		1,017
Total		12,000

Source: Based on unpublished data from the publishers of the individual newspapers listed and data from *Newsprint Facts at a Glance*, 13th edition (New York: Newsprint Information Committee, 1971).

As indicated, total newsprint consumption in Montana in 1971 was about 12,000 tons. This figure excludes out-of-state newspapers brought into the state and subsequently disposed of, which means that not all the newsprint consumed could be recovered for reuse in any Montana program. Experience in other cities indicates that a participation rate ranging from 12 to 35 percent could be expected. For example, if Missoula citizens began to separate old newsprint from their household trash for reuse or recycling, a maximum of 4,200 tons of newsprint could be expected to be salvaged a year.

*The study on which this article is based was initiated by *The Missoulian*. Financial support was given by five principal Montana newspapers: *The Missoulian*, the *Billings Gazette*, *The Montana Standard* (Butte), the *Independent Record* (Helena), and the *Great Falls Tribune*.

James Edwards graduated from the University of Montana with a master's degree in Business Administration in July 1972. He was a Research Assistant for the University of Montana's Bureau of Business and Economic Research during 1972.

The Problem of Solid Waste Disposal

Generally defined, solid waste is residential refuse and other discarded materials, including solid waste materials from commercial, institutional, industrial, agricultural, and mineral operations. Municipal wastes are the part of solid waste with which we are most familiar—residential, commercial, and institutional wastes; they account for about 360 million tons (or about 10 percent) of the 3.5 billion tons of waste materials generated annually in the United States. Today, the average citizen discards about six pounds of municipal trash per day. In 1920, this figure was three pounds, and by the year 2000 the figure will have grown to ten pounds.[1]

The Bureau of Solid Waste Management estimates that expenditures for the handling of all waste materials will rise from $6.5 billion in 1970 to $16.5 billion annually by 1980.[2] Direct costs of managing solid wastes are only a small part of the total price of controlling solid wastes. Indirect costs (known as social costs) must also be considered when weighing the full impact of solid waste pollution. Health hazards, property damage, environmental degradation, and the permanent loss of valuable resources are just a few of the costs that cannot easily be measured but result from our deficient waste disposal practices.

According to a recent report published by the Environmental Protection Agency's (EPA) Office of Solid Waste Management, paper makes up the largest percentage of the municipal solid waste stream:[3]

- 55% paper
- 14% food
- 9% metals (ferrous and nonferrous)
- 9% glass
- 5% lawn and garden
- 4% wood
- 3% clothing, rags, rubber, leather, dirt, etc.
- 1% plastic

These wastes are normally collected by municipal collection systems and do not include waste materials discarded into sewage systems or those emitted with smoke or gas.[4]

While paper adds most to the nation's solid waste, it has these important advantages: it can be collected, sorted, transported, processed, and made into new products, rather than burned, dumped, or buried.

The United States consumes almost 60 million tons of paper and paperboard each year. Of this volume, about 20 percent is recovered and reused.[5] Most of the remaining paper fiber is discarded as municipal refuse. One estimate is that as much as 66 percent of the millions of tons of paper and paperboard going into the municipal refuse stream is reclaimable.[6] Paper fibers have been recycled since before World War II for use in the production of toweling, tissue, boxboard, and container board, but the wastepaper recovery rate has been declining since 1944 when it was 37 percent. Certain Western European countries and Japan recover nearly 50 percent of their recyclable fiber, some of which is imported from the United States.

Table 2 gives a more complete breakdown of the percent of wastepaper recycled in other countries.

Table 2

Recycled Wastepaper in the United States and Other Countries, 1971

Country	Percentage of Production	Percentage of Consumption†
West Germany	46	32
Japan	37	38
United Kingdom	37	26
France	33	29
United States	20	18
Canada	4	11

Source: Recycling at Simpson Lee (San Francisco: Simpson Lee, 1971).

†Production plus net imports.

[1]National Center for Resource Recovery, Inc., "Resource Recovery: An Overview," *Bulletin*, vol. 1, no. 1 (Washington, D.C.: National Center for Resource Recovery, Inc., October 1971), p. 2.

[2]"Solid Waste Management Costs are Seen Rising 'Explosively' during the Coming Five Years," *Oil, Paint and Drug Reporter* (December 21, 1970), p. 7.

[3]National Center for Resource Recovery, Inc., pamphlet (Washington, D.C.: National Center for Resource Recovery, Inc., n.d.).

[4]National Industrial Pollution Control Council, *Paper*, Sub-Council Report (Washington, D.C.: U.S. Government Printing Office, March 1971), p. 57.

[5]Lawrence F. Burch, "Recovering Resources from Solid Wastes," *Journal of Environmental Health*, vol. 34 (March-April 1972), p. 489.

[6]Gary C. Myers, "Separating Household Wastepaper: Survey Results," *TAPPI*, vol. 55 (March 1972), p. 389.

Recently, the U.S. Forest Service's Forest Products Laboratory in Madison, Wisconsin, conducted a household survey to determine the typical composition of wastepaper in household trash. Their results showed that daily wastepaper discards averaged 0.53 pounds per person and consisted of 47 percent newspapers, 13 percent magazines, 12 percent strong papers, and 28 percent all other papers.[7]

Some authorities argue that if waste newsprint could be eliminated from the municipal refuse stream, cities across the nation could save thousands of dollars annually by reducing costs of collection, transportation, and dumping of waste materials into sanitary landfills or other disposal systems. They also contend that with every ton of newsprint currently salvaged from refuse and recycled, man saves 17 trees. Moreover, since the newsprint recycling process can be repeated, an even greater savings can result. Newsprint consumption in 1970 was 9.6 million tons.[8] This required over 150 million average-sized trees.

In addition to conserving raw materials, for every ton of paper stock that is collected and reused, taxpayers may save about $25 per ton in the cost of refuse disposal.

Members of the pulp and paper industry assert that because hundreds of millions of dollars are spent annually for the proper management and renewal of our forest land, users of wood pulp are not damaging forest resources. As the rebuttal goes, wood for all paper, including newsprint, is a renewable natural resource and is harvested like any other renewable crop. These growing trees also supply the atmosphere with much needed oxygen.

Contradicting the conservationist arguments, the U.S. Forest Service claims that 15 percent more land is being used to grow trees in 1972 than ten years ago, despite withdrawals of some forest lands for other uses. It is also true that productivity is increasing. Both the Forest Service and private producers are increasing their timber production per acre.

Another disclaimer to the preservation of forest resources through increased waste newsprint recycling is that newsprint is mostly made from the side products of the lumbering and plywood industries; consequently, the reduction in the amount of virgin pulp needed through increased recycling would not be appreciable. Only about one-half of a sawlog's fiber is used in the industries. Most of the remainder—not used for newsprint and other paper products—is burned, resulting in air pollution.

Nevertheless, many authorities still conclude that if our forest resources are going to keep up with the increasing demand for paper pulp, a larger percentage of newsprint must be recycled. Of the more than 9.6 million tons of newsprint produced each year, about 23 percent is recycled. About 5 percent of this total 23 percent is de-inked for use as newsprint, and most of the remainder is used to make cardboard.[9]

In 1969 (only complete figures available) the nation's pulp and paper industry used 800 million trees and produced about 58.5 million tons of paper and paperboard, or about 500 pounds for every person.[10] Of this total, 11.4 million tons of fiber were recycled (20 percent recycling rate).[11]

Disposal of Solid Waste

Trash technology has advanced only slightly during the last century; present disposal practices remain almost unchanged from years past. Present methods usually pollute and are almost always expensive, wasteful, and inefficient. Even nonpollutive and reasonably efficient disposal methods cannot be counted on in the future to deal with the predicted increase in volume of solid waste and wastepaper.

The more acceptable methods for recovering and disposing of a city's municipal refuse are mentioned below. In considering each of the alternative systems available, it is important to remember the high percentages of wastepaper and newspaper normally contained in municipal refuse.

Cities have historically chosen the disposal means which requires the least capital investment. About 84 percent of the nation's municipal

[7] *Ibid.*

[8] Newsprint Information Committee, *Newsprint Facts at a Glance*, 13th edition (April 1971), p. 11.

[9] American Paper Institute, *The Paper Industry's Part in Protecting the Environment* (1971), p. 21.

[10] E. F. Porter, Jr., "Paper Recycling: Problems Pile Up," *St. Louis Post-Dispatch* (February 14, 1971), p. 8.

[11] Henry G. Van Der Eb, "Recycling Wastepaper into Paper and Paperboard Packaging," paper presented at the American Paper Institute Seminar on Recycling Wastepaper, Washington, D.C., October 16, 1970, p. 6.

refuse has ended up in city dumps, 8 percent in municipal incinerators, and 6 percent in sanitary landfills. The remaining 2 percent is converted into compost or salvaged for reuse.

The oldest method of refuse disposal is the *dump,* where some 14,000 cities still deposit their trash. Though unquestionably cheap—about 25 cents per ton—this is considered the most hazardous and unsatisfactory method of disposal, particularly because of its disease-breeding quality and the eyesores these unlawful dumps create.

Incineration means enclosed burning and is the second most common means of waste disposal. About 300 municipal incinerators now operate in the country. According to the EPA's Solid Waste Management Office, 96 percent of them are publicly owned, and three-fourths of them burn refuse without even rudimentary air pollution control equipment.

One of the least expensive methods for disposing of municipal waste is by use of a *sanitary landfill.* Sanitary landfill means compacting and burying solid wastes as they are dumped on land. With open dumps no longer an acceptable means of disposal, landfills are becoming more common. Where suitable land is available within economic transportation range, it costs less to start a sanitary landfill than an incineration system. Another advantage is that a sanitary landfill will not burn, cause odors, spread litter, or breed vermin, as long as each day's deposits are adequately compacted and properly covered. There is no pollution, and eventually landfill sites can be converted into community assets such as golf courses and other recreational sites.

Unfortunately, many solid waste managers cannot find cheap, accessible land near the city to make the transportation of refuse to the landfill site economically feasible. Another limitation is that any water that stands on, or flows over a landfill must be diverted from a city's water supply or purified.

Composting, the biochemical degradation of organic materials, is an additional sanitary process for treating solid wastes. The basic steps in composting municipal wastes are: separating the organic from the inorganic fractions; grinding the organic fractions and controlling the decomposition; drying and screening or grinding the compost; delivering the product to consumers or a landfill. During the process, the composter must control the temperature and moisture and expose the organic refuse to enough oxygen that microorganisms present in the refuse can decompose and digest the compost. Finished compost normally takes a minimum of one month to complete. Compost has a number of potential market applications, some of which will be discussed later. Properly managed, composting can produce a product safe for agriculture and gardening use.[12]

Recycling or reuse of materials contained in solid wastes is a method of reducing municipal refuse that transcends the traditional collection and disposal systems. When new considerations for health and air pollution control standards prompted the end of open burning, many public and government officials concluded that recycling offered the best long-run solution to the solid waste crisis.

At present, the primary barriers to increased resource recovery are unfavorable economic conditions, difficulties in collecting and sorting of waste materials, the contamination and quality of recycled materials, and problems associated with marketing salvaged materials. New recycling techniques are being sought through research and demonstration grants from the federal solid waste management program to enhance the feasibility of recycling solid wastes.

Another reason present efforts have been ineffective is that recycled products generally cost more than those made from virgin materials. So far, all of the components of solid waste must be separated by hand before recycling, except for ferrous metals which can be drawn out magnetically. If the labor used to handle the waste materials is not voluntary, the cost in wages can be as much as four times above what the recovered products are worth.

Recycling of wastepaper usually refers to the collection and recovery of papermaking fibers, sometimes for use in products of equal quality, but also for use in products of lower quality. The federal government, through the General Services Administration, announced in August of 1971 that it will require the inclusion of wastepaper in the corrugated fiberboard which the GSA buys to line packing cartons. The GSA's

[12]For information on composting, see National Center for Resource Recovery, *A Report on Composting* (Washington, D.C., April 1972); and U.S. Governmental Protection Agency, *Composting of Municipal Solid Wastes in the United States* (Washington, D.C.: U.S. Government Printing Office), p. 1.

specification requires that new fiberboard contain at least 35 percent waste fiber. Of this, 10 percent must be "post consumer wastes." This includes materials collected from homes, offices, and factories that have been used. The remaining wastes include manufacturing wastes, forest residues, and other wastes.[13]

For this article's purposes, the most commonly accepted definition of recycled paper is the recovery and reuse of solid wastes (wastepaper) to create new products.

The National Academy of Sciences recently recommended to the paper industry that it increase its present recycling rate from 20 percent to 35 percent by 1985. Since the production of paper and paperboard is forecast to double by that time, achieving this suggested level will require a recycling increase of almost 300 percent.[14] The NAS estimates that the potential savings from a 35 percent recycling rate in 1985 would represent 31 million cords of wood.[15]

Newsprint recycling. Recycling old newspapers isn't new. For years waste newsprint has been reincarnated as paperboard, wallboard, cartons, paper trays, and other products. In 1969 three paper-making plants recycled 365,000 tons of waste newspaper into 320,000 tons of fresh newsprint valued at about $45 million. This is equal to 11 percent of the newsprint produced and 5 percent of the newsprint consumed in the United States in 1969.[16] De-inking was first recognized as an obstacle during the mid-1940s, when attempts were first made to process old newspapers to make newsprint, thin paper for telephone books and catalogs, paper towels, and cleansing tissues. The cost of de-inking waste newspaper for newsprint was high at that time, and the quality of the newsprint was unsatisfactory. The color of the recycled newsprint was more off-white than the de-inked newsprint produced today. The quality and usability of today's recycled newsprint is believed to be nearly as good as newsprint made directly from tree pulp. In addition to preserving natural resources and reducing wastepaper discards, recycled newsprint has sold for significantly less than newsprint made from virgin pulp.

The improvement in processing waste newspaper into newspaper is credited to Richard B. Scudder, chairman of the Garden State Paper Company. In 1961 Scudder opened his first full-scale production facility for de-inking and reclaiming old newspapers at Garfield, New Jersey. Few in the paper industry initially believed in the practicality and economic feasibility of the project. However, eleven years after its birth, "Scudder's Folly" is a definite success. Not only has his operation maintained its original share of the market for newsprint, but it has added plants at Alsip, Illinois, and Pomona, California, for recycling newspapers. All three plants are located near large urban generators of newspaper. With a combined annual tonnage of 350,000, Garden State could double in size during the next few years, if the demand for recycled newsprint increases at anticipated rates. In 1971, expansion plans, including a 30 percent increase in production capacity at the California plant, were delayed because the industry-wide demand for newsprint slackened.[17]

Garden State estimates that a minimum-sized newsprint recycling plant producing 300 tons of newsprint a day would require 350 tons of waste newsprint—a supply which could be considered dependable only in a metropolitan area consuming at least 1,500 tons of newspapers daily. Garden State is the only newsprint company on the continent which has been able to operate seven days a week and sell all of its product during 1971. Garden State uses no virgin fibers in its recycling processes and it does recycle newsprint which has been recycled before without the addition of virgin fiber. This process can be continued until "the proportion of already recycled paper in the furnish reaches 40 percent or thereabouts."

The demand for old newspapers fluctuates with the general health of the economy. Garden State says, "The manufacture of cardboard boxes is one of the most reliable indices to the health of the business. When retail sales are up, the use of old boxes, and therefore the use of old newspapers, is

[13]"GSA Changes Recycled Definition, Applies to One Grade," *Pulp and Paper (September 1971), p. 101.*

[14]Lyle J. Gordon, "Recycling," *TAPPI*, vol. 54 (June 1971), p. 895.

[15]Bank of America, *Paper Recycling: A Report on Its Economic and Ecological Implications* (San Francisco, December 1971), p. 13.

[16]Neal F. Clemons, "Yesterday's Newspaper Finds a New Use? It's 'Laundered,' Made into Today's Paper," *The Wall Street Journal* (January 5, 1970).

[17]Michael D. Sullivan, "Garden State Paper Company: Modern Phenomenon," *Pulp and Paper* (September 1971), p. 116.

also up." To maintain a balanced raw material supply during these fluctuations, which frequently result in price variations, Garden State maintains an inventory of about 18,000 tons in its receiving and storage warehouses. In addition, Garden State maintains a minimum price which it will pay for waste newspaper, thereby ensuring price stability in a market noted for its volatility.

The Garden State mill at Pomona receives approximately 8,300 tons of waste newspaper per month for recycling. This is 5,300 tons more than the state of Montana could offer in *one year* for recycling, assuming a 25 percent participation rate (table 1).

The wastepaper recycling process begins with sorting to remove nonpaper waste called contaminants. Wastepaper is then classified according to quality. Some wastepaper recycling mills process other forms of wastepaper (e.g., used IBM cards) in addition to waste newspapers; consequently, these fibers must be sorted separately before recycling. The sorted paper is then shredded and repulped in hydrapulpers. Both during and after the repulping process, the fiber goes through a series of treatments to remove additional contaminants which were introduced during the original paper-making process–dyes, bleaches, rosin size, fillers, titanium dioxide, and the like. These contaminant removal processes are collectively referred to as de-inking. After de-inking, the recycled paper fiber continues through the normal paper production processes.

The three Garden State mills are the only U.S. operations in existence which specifically recycle waste newsprint into new newsprint. There are other secondary fiber mills that recover newsprint as well as other forms of wastepaper for recycling into other products such as building materials.

Problems of newsprint recycling. The technology for making recycled paper is not as advanced as that for producing paper from virgin fiber, but enough research has been conducted to show that recycled paper products can be manufactured at a reasonable cost. Nevertheless, a number of problems remain to be solved.

The primary obstacle to almost any wastepaper recycling program is economic. Collection, sorting, and transportation account for more than 90 percent of all expenditures for processing wastepaper. Methods of collection vary widely; and the success of recycling wastepaper is dependent upon its being kept separate from other refuse—starting at the source of supply. More than any other form of wastepaper, newsprint is the easiest and most practical to separate for collection. An effective system for collecting newspapers could solve part of the problem of wastepaper in the municipal refuse stream.

Separating and collecting newsprint for reuse has been proven to be economically feasible only in areas where the supply satisfies the demand. Densely populated areas within close proximity of markets have thus far proven to be the only geographic areas suitable for reclaiming waste newsprint. Even in areas where demand and supply for waste newsprint are favorable, problems can still arise to restrict the success of a program.

Bank of America classifies the difficulties inherent in paper recycling into two broad categories: the problems of the producer (the paper company that purchases the wastepaper) and the problems of the processor or consumer.

1. The producer's problems begin with the removal of contaminants remaining in wastepaper after it is purchased from the wastepaper dealer (or a city's recycling center). Unintentional contaminants such as food wastes, rubber, and metal bands are easily removed by wastepaper dealers. However, producers are forced to employ de-inking procedures to remove intentional contaminants such as nonsoluble inks and glues.

2. The processor's or consumer's problems are fewer and less significant than those of the paper producer. The prices for recycled newsprint are comparable and often cheaper than the price per ton of newsprint made from virgin pulp. However, recycled paper used by some processors may be subject to more variation in shades of white and two-sidedness of colors than the virgin paper utilized by other consumers. Recycled paper, as well as some virgin paper, also creates problems for optical character recognition (OCR) machines which "read" written characters electronically. Strength can also be a problem for the processor. Each time paper is recycled, the length as well as the strength of the new fiber is diminished.

The de-inking process employed by each of the three Garden State newsprint recycling mills is a secret formula which removes the ink and other objectionable nonfibrous materials from a slurry (watery mixture) of waste newsprint. Even though the de-inking plant uses from 330 to 345 tons of old newsprint daily, the process has certain

limitations. It requires the use of 4.5 million gallons of fresh water which produces approximately 2.7 million gallons of effluent including 71 tons of organic matter such as fiber and ink chemicals, which must be disposed of.[18] And only clean newspapers can be used. Separation at the source or point of collection (presorting) is the only reliable way to avoid contamination.

Federal policies which presently favor the use of virgin materials over recyclable materials also limit the success of today's recycling efforts. For example, the federal government allows a depletion allowance to the forest industries on renewable resources. Also, commodity rates for hauling raw materials such as ore and paper pulp have been lower than the long-distance freight (class) rates which govern the transportation of waste materials (e.g., wastepaper) for reclamation and recycling purposes. These inequitable freight rates are perhaps the greatest deterrents to establishing an economical newsprint recycling program—particularly in Montana and the Northwest. In marketing salvaged products, the aggregate costs, including transportation costs for reprocessing of waste materials, must compete against the cost of using virgin materials. Low-cost commodity rates are needed to encourage the recycling of waste newsprint and other recyclable materials.

Legislation effected by a few municipalities has played a decisive role in determining the success of their waste newsprint recycling campaigns. Hempstead, New York, and Irvington, New Jersey, are two municipalities which have created successful newsprint recycling programs by making it illegal to throw old newspapers into the garbage. Both cities started out by having newspapers bundled by householders and picked up by municipally owned collection trucks. Hempstead's ordinance forbids the pickup of bundles by anyone but its own packer crews. Irvington permits free-lance collectors, such as minority groups, the unemployed, and the indigent, in order to insure a more widespread collection of wastepaper.

Hempstead's Sanitation Commissioner, William J. Landman, gave the following four points when asked to summarize for solid waste managers in other towns the most important lessons he had learned from Hempstead's program:[19]

> First, require cooperation by ordinance. Don't depend on voluntary separation alone.
>
> Second, emphasize the importance of bundling newspapers by themselves. Clean newsprint, by itself, sells for two to four times more than mixed paper.
>
> Third, make sure the newspaper pickup schedule is realistic, so that householders can depend on their bundles being picked up if they form the habit of placing them at the curb the same day each week.
>
> Fourth, to make your newspaper collection system economically sound, I recommend eliminating competition from private entrepreneurs by ordinance. I believe the tax dollar should be protected by making sure that collection costs will be offset by the sale of the paper as well as by the savings in disposal costs.

Madison, Wisconsin, is another city well-known for its newspaper recycling program. In 1971 the city-sponsored effort collected 2,800 tons of waste newspaper from households to be reused as newsprint. The participation rate was 30 percent compared with a national average of about 23 percent; that year the city netted $12,000 on its recycling program—the first profit in three years of operation.[20]

The success of Madison's salvage project seems to be dependent to a large degree on the local housewives who have given it their all-out support; they have taken the responsibility for bundling the newsprint for recycling.

A few other collection drives deserve mention. In Union, New Jersey, a volunteer experiment in which a Boys' Club benefited ran for three months with a 25 percent participation rate. In San Diego, California, the Kiwanis Club has utilized over 200 "drop boxes" to facilitate its collection program. For each filled box the club gets $5 and the city's recycling center gets $8. In Louisville, Kentucky, a controlled experiment has been undertaken where bundled paper placed on residential curbsides is picked up by noncity-owned trucks. The *Louisville Times*, which has given considerable support to the program, provides string for bundling inside its Sunday papers.

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[18]R. N. Wiewel and W. B. Lavery, "Pollution—De-inked Newsprint—Recycling of Fibre," mimeographed (July 13, 1970), p. 2.

[19]John Kolb, "Suburban Newspaper Recycling," *Compost Science*, vol. 12 (September-October 1971), p. 15.

[20]Personal correspondence from John N. Klungness, Research Chemical Engineer, Recycling Systems and Applications, U.S. Department of Agriculture, Forest Service, Forest Products Laboratory, Madison, Wisconsin (March 28, 1972).

Potential Uses for Waste Newsprint

Recycling of wastepaper is one solution to our mounting solid waste problem which offers more possibilities for recovery and reuse than any other solid waste commodity. Modern research strives constantly to eliminate burdens on landfills and other disposal methods and to find new market uses for wastepaper. Present markets do exist for waste newsprint as well as other forms of wastepaper; however, a number of factors limit their application.

It is important to note that many of the potential applications are merely in the research stage, and, in some instances, the mention of wastepaper may include other paper in addition to old newsprint.

Potential Uses for Waste Newspaper

1. Recycled pulp for newsprint
2. Production of building materials; wallboard, roofing, insulation, bricks (building blocks)
3. Recycled pulp for wood: pressboards and hardboard
4. Conversion into active carbon or charcoal
5. Conversion into protein
6. Firelogs
7. Soil extenders: compost and/or asphalt
8. Exports
9. Other uses: production of alcohol, sewer pipe, thermal energy, fuel briquettes, or packaging for fish worms

Recycled pulp for newsprint. The implications and prerequisites of newsprint recycling have been discussed. Garden State's Pomona, California, mill is the nearest newsprint recycling plant to Montana. Two major considerations prevent the likelihood of Montana collecting its waste newsprint for transportation to the Pomona plant.

Since Garden State pays only $36 a ton (susceptible to fluctuation), transportation and handling costs make this proposal economically unfeasible for Montana.

The Garden State mill at present operates with a sufficient tonnage of waste newsprint supplied to it from surrounding areas. Additional inputs would not only overstock its present supply of salvaged newsprint, but it could also depress the current market price, already threatened by a slack in the industry demand for newsprint.

The likelihood of Garden State building a de-inking mill in the Northwest is almost zero. The state of Montana offers only enough waste newsprint per year to keep a recycling plant operating for less than one month. Montana's newspapers consume about 12,000 tons of newsprint annually, and only a portion of this amount, perhaps 25 to 30 percent, could be collected for recycling. Moreover, because the state is so sparsely populated, it would be difficult economically to collect the wastepaper for transportation to a mill.

Establishing a mill in a large Northwest metropolitan area such as Seattle is also economically unsound for the same reasons. To be economically practical, a newsprint recycling mill must produce at least 80,000 tons of newsprint annually. Such a plant would cost from $20 to $23 million and would require about 20 acres of land. Railroad links, a water supply of about 6 million gallons daily, and adequate sewage treatment facilities are also necessary. Thus, the size of the investment dictates location near massive sources of supply and end markets for recycled newsprint.

Future market potential for de-inked newsprint is uncertain. Mr. Scudder of Garden State feels that a maximum amount of recycled newsprint that could be supported in a given market would be 40 percent.

Production of building materials. Another major use of waste newsprint is in the manufacture of building products, although these markets are not new. Roofing papers, flooring papers, and insulation board have traditionally used wastepaper fibers, and manufacturers of gypsum wallboard are important users of waste newsprint.

Nevertheless, researchers are continuing to create potential new markets for wastepaper used in the production of building materials. In Alamo, California, a mechnical engineer has developed a process for compressing wastepaper into bricks that he says can be used as a substitute for conventional mud and clay bricks used in many underdeveloped countries.

The former researcher for Standard Oil of California shreds newspapers into a drum of water to be pulped with a motorized plastic mixer. After the water is squeezed out, pozzolan cement, sodium silicate, and gypsum are added to produce a gray colored brick whose weight is 55

percent paper. For compressing the materials, he uses a hand press to get pressures up to 2,000 pounds per square inch. Drying in the sun completes the process. Production time is about two minutes per brick, plus a week's drying time.[21]

Each brick weights almost two pounds and includes 72 pages of waste newsprint; they are about one-half the price of ordinary clay bricks. Ordinary mortar holds the paintable bricks together, and they are fire- and waterproof. The inventor developed the bricks as an afterthought after compacting old newspapers into bricks to be burned in his fireplace.

The project is still experimental. A California grade school has built a demonstration shed with the bricks to test their usability. Although the conversion process is economical, markets for the recycled materials are still uncertain.

Another project which deserves mentioning is in Lake Park, Georgia, where the Tunison Brick Company has built a home featuring bricks with an aggregate of inorganic waste materials mixed with cement and common chemicals and formed in a pressure molder. The program is federally subsidized and the process is currently being used by a licensee in the Bahamas to construct a resort community.[22]

Manufacturers of insulation materials are other important users of newspaper. About three pounds of treated newsprint makes one cubic foot of fireproof insulaton. Shredded newspapers are treated with chemicals and blown between interior and exterior walls. The material retards condensation, is nonallergenic, and deadens unwanted noises. The future use of newsprint in the production of insulation is unknown; some believe that other waste materials more suitable for the production of insulation are readily available.

The future demand for waste newsprint as a component used in the production of roofing felt is similar to the future demand for wallboard made from newspapers. When the general health of the economy is high, so will be the demand for these materials. Even though wastepaper has been a traditional component for use in the manufacture of building materials, its use will not cause any significant reduction of our nation's wastepaper problem.

Recycled pulp for wood. At the Westinghouse Research Laboratories engineers are working on a project which is turning paper back into wood. The research is part of a broad program in the ecological systems department of the Westinghouse Research Laboratories to find uses for solid waste materials. In one experiment engineers have used seven pounds of shredded newspapers in making a "wooden" cabinet, only the framework of which is natural wood.

The simulated wood is made from newspapers combined with an equal weight of an industrial waste material, mostly scrap from the manufacture of such things as plastic wall plates, switches, and receptacles. The researchers have turned the wastes into an inexpensive hardwood by heating the mixture to about 300° F and squeezing it with pressure of about one ton per square inch. The product is not totally new—hardboard is ordinarily made from sawdust and a binding chemical.[23] In Bangor, Maine, research is currently underway to better utilize recycled newsprint for this material. But thus far, the lack of demand does not promise much for the future of this product.

Conversion into active carbon or charcoal. Another potential market exists through the conversion of wastepaper into active carbon. Two pertinent studies are currently being conducted under the sponsorship of the EPA. At the Stanford Research Institute, char produced from solid waste is being tested for its effectiveness as an adsorption medium.[24] At the University of Montana, the Department of Chemistry is concerned with developing feasible chemical methods to recover useful by-products from wood and cellulosic wastes. Under the direction of Dr. Fred Shafizadeh, Professor of Chemistry and Forestry, the group is concentrating on producing active carbon from residual paper pulp obtained from the Black Clawson recovery system in Franklin,

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[21]"Recycled Newspapers by Building Brick Walls," *Newsprint Facts*, vol. 14 (November 1971), p. 4.

[22]"Inorganic Waste Used for Low-Cost Bricks," *Journal of Environmental Health*, vol. 34 (March-April 1972), p. 495.

[23]"Recycling with a Twist: Paper Waste Turned into Wood," *Pulp and Paper* (September 1971), p. 106.

[24]R. Eliassen, "Effectiveness of Char Produced from Solid Wastes as an Adsorption Medium," *Summaries of Bureau of Solid Waste Management Contracts, July 1, 1968-June 30, 1970*, Supplement to U.S. Department of Health, Education,and Welfare, Public Health Service, Publication no. 1897 (Washington, D.C.: U.S. Government Printing Office), p. 33.

Ohio. The Ohio plant uses as input unsorted solid wastes generated from a community of 10,000 persons. The system is also designed to recover some valuable materials such as glass, aluminum, ferrous metals, and the like. The plant's residual is a paper pulp which may contain as much as 10 percent noncellulosic organic material (plastics, food refuse, etc.).[25]

The distinguishing feature of active carbon is its ability to selectively adsorb materials on its surface, thus removing them from a flow process. These materials are easily held on the carbon because the latter needs them to balance uneven forces present at its surface.Some of the materials are adsorbed in small pores present in the carbon. It is noteworthy that after the carbon has been used and its adsorption power is lost, it can be reactivated by heating and reused again.

Commercial uses of active carbon take advantage of its adsorptive ability to remove impurities in a flow stream. For example, following the chlorination of drinking water (to make the water potable), the water is treated with active carbon in order to remove the chlorine and other taste-and-odor causing agents such as algae. Active carbon is also used to remove the colored impurities in sugar solution during its processing. In both of these processes, the solutions are passed through long columns filled with the active carbon.

Pharmaceutical companies use large amounts of active char to purify various drugs in a manner similar to that of the sugar industry. Active carbon is also used to purify solvents for reuse in the dry cleaning and chemical industries, and to purify and deodorize air in air conditioning systems.

Active carbon may someday act as a means for furthering environmental quality. One study is testing the use of active char as a means of removing sulfur and nitrogen compounds from automobile mufflers.[26] In a related study, active char is being used to remove sulfur dioxide from flue streams of fossil-fuel burning plants, such as electricity generating facilities.[27] The St. Regis Paper Company has recently received a federal grant for developing possible technology that would produce active carbon from pulp mill wastes and use it to remove effluent matter from the pulp mill's waste water stream.

Wastepaper, including waste newsprint, contains approximately 40 percent carbon and is therefore a valuable source of active carbon. Active char is presently being produced from used pulp, but the process is expensive and the quality is often low. Present demands for the chemical are easily being met by methods using coal, sawdust, or lignin sulfonate as raw materials.

It has been estimated that 100 pounds of wastepaper can be reduced to 25-30 pounds of active carbon. Present market prices for active carbon range from .47 to .59 cents per pound, depending upon the quantity and quality purchased.

Even when the process for converting wastepaper into char becomes economically feasible, the demand for active char may be insufficient to cause a significant reduction in the amount of paper or newsprint discarded. It is believed, however, that the market for active carbon in water treatment will double within the five-year period ending in 1976.

Conversion into protein. A number of studies are taking place across the country to investigate the conversion of cellulose waste into a low cost, high protein food, using a microorganism that converts cellulose into protein. At Louisiana State University, federally supported researchers are conducting tests where cellulose waste (including newspaper) is ground, treated chemically, sterilized, and then fed into a fermentor where the cellulose is degraded and metabolized as the microorganisms multiply. The microorganisms contain about 50 percent crude protein and, when dried, make an edible product which can be a valuable supplement for animal feeds.[28]

A similar study in Beltsville, Maryland, has found that newspapers can act as a supplement to cattle feed. The study is a part of a general effort to make ruminant animals—sheep, beef cattle, and dairy cows—more efficient users of waste materials. One experiment simulated a winter feeding situation. Newsprint, molasses, cracked corn, soybean meal, etc. were fed to steers at the rate of about one part newspaper to nine parts concentrates. In the finishing study, the steers were slaughtered at around 950 pounds, and the

[25]"Reclaiming Municipal Garbage," *Environmental Science and Technology*, vol. 5 (October 1971), pp. 998-99.

[26]American Petroleum Institute, "Charcoal Device May Cut Auto Pollution," *The Oil and Gas Journal*, vol. 65 (January 16, 1967), p. 60.

[27]"Environemental Currents," *Environmental Science and Technology*, vol. 4 (April 1970), p. 273.

[28]Burch, "Recovering Resources from Solid Wastes," p. 489.

evaluation showed no overall differences in the carcasses when compared to normally fed steers.[29]

Again, this application is only in the research stage. Market acceptance is not proven and the future use of waste newsprint as protein in animal food is still experimental.

Firelogs. Waste newsprint has also been used in the production of "logs" for fuel. Most suitable for the home fireplace, these logs are similar to the pressed sawdust "prestologs"; in Oregon they are called the "Oregon Firelog." The manufacturing process is similar to that used in the production of pressboards and hardboard except that the logs are sprayed with oil. They are then wrapped in oil-proof paper and sold in supermarkets. Customer acceptance and demand have been limited, and their manufacturing cost has not justified a wide-scale level of production. Other reasons for customer apathy (particularly in the Northwest) are understandable: the availability of real wood resources and the relatively high cost of the manufactured product.

Soil Extenders. The present-day use of compost as a soil conditioner is not comparable with other methods of fertilizing. In general, composting is expensive and its minimum month-long production process requires many manhours. However, a number of unrelated studies are attempting to find new compost uses for municipal refuse. Westinghouse, for example, is adding compost to paving materials, asphalt, sand, stone, and lime to produce an experimental road project—which is more resistant to cracks than customary asphalt roads. The compost Westinghouse is using is made commercially by removing metals, glass, and other nondegradable materials from the trash, grinding the residue, and letting it decompose until mostly cellulose remains. The peatlike material is the same as the compost used as a soil conditioner.[30]

Future possibilities for eliminating urban refuse through composting are perhaps more interesting and encouraging than those noted. However, more time and research is needed before any workable application can be accepted.

It is perhaps significant that of the 17 composting plants once in existence, only two are still operating.

Exports. Another market for old newspapers exists abroad—more specifically in the Orient where the supply of timber as well as other raw materials is inadequate. In order to satisfy the foreign demand for pulp, some United States ports are shipping newspapers to the Orient for reuse. At present, the price paid for the old newspapers is such that inland areas cannot economically transport their wastepaper to shipside for recycling. One price quoted was as low as $5 per ton, another was $22 per ton—FOB ship. Many environmentalists are optimistic that the market for exporting wastepaper will increase. Seattle and Portland are the two areas closest to Montana that buy newsprint for shipment abroad. The curret price (April 1972) for bailed No. 1 news, FOB Portland/Seattle is $13 to $14 per ton.

Considering the freight factor, the transportation of newspaper to the Portland/Seattle areas for recycling would be economically unsound. Commerical rates by truck and rail to Portland and Seattle from Missoula begin at $24 per ton. This does not include costs for shredding and bailing, plus a probable additional charge for loading and unloading. Even with the possibility of lowering the shipping rates in the future, demand for Montana newspapers to be used for export would not be significant since the availability of old newspapers in Portland and Seattle is more than adequate.

According to Consolidated Fibers, a dealer in waste newsprint, the current national supply of newspapers for exportation far exceeds the demand. For example, in the Los Angeles area approximately 200,000 tons per year are handled (for domestic and export markets) which represents less than 31 percent of the potential supply. The demand fluctuates considerably according to economic conditions, building starts, foreign markets, and seasonal production factors.

Over the past ten years, the amount of U.S. wastepaper exports has fluctuated widely. The percentage increase between 1969 and 1970, for example, was a whopping 41 percent. When domestic demand falls off, secondary fiber prices weaken and they become more attractive as an export commodity. Nevertheless, many authorities contend that export demand is generally constant, varying according to local situations within importing nations.

The major importers of U.S. secondary fibers

[29] "News That's Fit to Eat," *Agricultural Research (February 1971)*, p. 11.

[30] "Compost Added to Asphalt Shows Strength in Test," *Journal of Environmental Health*, vol. 34 (March-April 1972), p. 496.

have been Japan, Korea, Mexico, the Philippines, Venezuela, Canada, and Italy. These countries account for 87 percent of total U.S. wastepaper exports. Current worldwide consumption of paper and paperboard is 72 pounds per person compared to a U.S. consumption figure in 1969 of 576 pounds, with all other countries consuming less than 50 pounds per person.[31]

Other uses. Wastepaper may be recycled for other uses, but the application of each will also be limited. Since 1927, the McGraw Edison Company of West Bend, Wisconsin, has been using waste newsprint as the main component in the manufacture of sewer pipe. The plant uses 15 tons of newsprint daily to turn out pipe in diameters of two to eight inches. After the old newspapers are repulped, the fiber is wound on a mandrel or tube to a desired thickness and dried. Then it is impregnated with a coal tar pitch.[32]

Besides being used for sewers, the pipe can be used for conduit for wires or for drainage systems. According to one company official, the product is trouble free and lasts indefinitely. The company guarantees the pipe for 50 years.

Other potential markets for using newsprint include the production of alcohol; fuel briquettes and thermal energy; and packaging of fish worms. In each case, the process is either expensive, or the demand low and the supply high.

Recycling Potential of Waste Newsprint in Montana and the Northwest

Considerations affecting the future of wastepaper recycling include (1) the economic factors related to the expansion of secondary fiber markets, (2) an improved technology, and (3) the psychological acceptance of recycled products by consumers. Without these three factors, the potential for recycling remains dim.

There are, however, additional factors which more specifically affect the future of Montana's recycling potential. Montana's newsprint recycling potential at present is economically discouraging. Five major considerations confirm this fact:

1. Montana's population is sparsely distributed, making the collection of recyclable waste materials difficult and costly.
2. The supply of recyclable newsprint is low, prohibiting the establishment of any necessary high-volume recycling operation.
3. High shipping rates generally forbid the transportation of waste newsprint to established recycling mills.
4. Large supplies of wood pulp and mill residues are readily available in Montana and the Northwest, diminishing demand for recycled material.
5. The aggregate demand for paper products in Montana cities is comparatively lower than that of other larger municipal centers.

Considering these limitations, Montana's potential for recycling waste newsprint is severely limited. However, one market does appear attractive. The Bighorn Gypsum Company in Cody, Wyoming, has promised to purchase all of Montana's old newspapers for use in the production of wallboard. W. C. Headlee, director of the plant, stated that "The mill will buy all the waste newsprint that it can get; however, any formal guarantee attesting to that fact would be impossible in case the plant was forced to close." In the eleven years of the plant's existence, Headlee commented, "We haven't had to turn anyone down to date."

The present market price paid for bundled or bailed newsprint at Cody is $20 per ton, and is not expected to fluctuate. The wastepaper is repulped and put in board mixed with from 95-99 percent gypsum.

The company presently purchases an average of 100 tons of wastepaper a month from cities as far away as Denver. At one time, Billings' citizens were sending old newspapers to Cody at the rate of about 10 to 20 tons per month in rented vehicles. The proceeds from the program went to a local charity group. Newspapers were collected during a two-hour period once every weekend at a local shopping center. Ecology-minded residents brought discarded newspapers to the center in their own vehicles and received no money for them. Volunteer help, usually high school students, bundled the newsprint. At present, the city is considering responsoring the program. This time "dump boxes" will be strategically located at some of the local schools for residents to dispose of old newspapers. When the program is reintroduced, the city will maintain the boxes, hoping that the newsprint will be shipped free to Cody—via U.S. Army vehicles.

[31]Lloyd E. Williams, "Turning Trash into Dollars," *Chem 26 Paper Processing (August 1971), pp. 28-30.*

[32]"Wisconsin Factory Converts Headlines to Pipelines," *Newsprint Facts, vol. 15 (November 1971), p. 4.*

Two carriers have tentatively agreed to ship newsprint from Missoula to Cody at a rate which is economically desirable. A Missoula contract carrier will transport 20-ton loads 411 road miles to the Bighorn Gypsum Company at a rate of about 45 cents per mile or about $9 per ton. The Burlington Northern Railroad has promised to at least meet this rate, and more likely beat it, by shipping 40-ton loads from $8 to $9 per ton. To date, neither carrier has made public any guarantees endorsing these rates, although they have promised them in the near future.

One advantage Missoula has for providing great impetus to a newsprint collection program is the Missoula Recycling Center. Since October 1971, Doug Stewart and Mark Richlen, senior university students majoring in business, and full-time managers of the center, have been collecting mostly beer cans and bottles for shipment free via brewery trucks to the West Coast, where they are recycled to be used again in their original form. Like most recycling operations, this center's success has been partially dependent on some financial support from local businesses, the city, and the county. However, the response from Missoula citizens has been overwhelming and has added considerable impetus to the program, thus giving Mr. Stewart and Mr. Richlen much optimism for the future, particularly for the proposed newsprint recycling effort.

Assuming the shipping rates were formalized, the men plan to initiate a countywide program in which residents and charity groups could bring their recyclable newsprint to the center, where it would be bailed and stored until an optimum tonnage of newspaper was available for shipment to Cody. It may be that local organizations, such as the Boy Scouts, would collect the wastepaper and share the profits with the Recycling Center.

Cities such as Butte and Helena could work together or independently to take advantage of the present $20 per ton market for old newspapers at Cody, despite the inherent danger of depressing the market.

Conclusions and recommendations. The economics of recycling is the real key to future increases in newsprint recycling. Two recent articles emphasize this fact. In a two-part article, Henry Perry, a management consultant to the paper industry, says, "At the present time economic problems overshadow the technical ones and control reuse more than any other factor."[33] In another article, consulting engineer Bjorn O. Lehto of Chas. T. Main Inc., discussed the vast increase in recycling needed by the 1980s: "If we are recycling 10 to 11 million tons today and in 10 years we have to recycle 40 million tons per year, it means that we will have to increase our recycling rates by 2 to 4 million tons every year, which indicates an immediate 20 percent increase in recycling."[34]

In order to effectively achieve recycling objectives, concerted efforts must be undertaken by government (federal, state, and local), business, and individuals.

First, an expansion of markets for products currently made from wastepaper in order to eliminate newspapers from the solid waste stream should be a priority of all concerned citizens.

Second, an increased development of new products made from reclaimed fibers is an essential part of expanding the present markets which now provide use for only a fraction of the suggested increase in newsprint recycling. Salvaging and recycling operations must be made more economically attractive, if necessary by subsidy, in order to provide incentives for individuals or companies to engage in them.

Third, more research must be conducted on all facets of recycling. Industry and government must work together to improve technology and research efforts for new uses of wastepaper. One interesting example of this is a study funded by the Gillette Company Research Institute and the Environmental Protection Agency. The project Gillette will research reduces (recycles) the size of the cellulose molecule, making it more like a starch or sugar than cellulose. The waste cellulose can then be readily transformed into useful chemicals, such as alcohol, or used in the production of antibiotics or food-grade yeasts.

One area which still requires a great amount of research is marketing. A far greater industrial demand is urgently needed but is not in sight. Many of the processes being developed through government research are not presently economically feasible nor have they been approved by governmental agencies (for example, newsprint

[33]Henry J. Perry, "The Economics of Waste Paper Use —Part I," *Pulp and Paper* (April 1971), p. 83.

[34]"Economics, Not Technology, Called Key to More Recycling," *Paper Age Convention Daily* (March 17, 1971), p. 10.

fed to cattle has not been approved by the Food and Drug Administration).

Fourth, government can play an extremely important role in stimulating recycling by setting precedents for business and the individual to follow. The federal government could promote the export potential for wastepaper. The demand for recycled wastepaper is predicted to grow rapidly in the coming years when overseas shortages of wood pulp and secondary fibers as well as high pulp prices occur.

The General Services Administration has set some precedent by requiring that a certain percentage of recycled fibers be used by that department, but additional incentives are needed. Many environmentalists support larger tax write-offs and lower freight rates that would reduce the costs of recycled materials as well as making the secondary materials industry professionally more attractive. Some favor such proposals as a universal ban on apartment house and private incinerators; the installation of pneumatic tubes to move trash to central collection points (these are currently in use in a New York apartment complex, a Los Angeles hospital, and Disney World in Florida); the creation of "regional waste management districts" crossing municipal, county, and state lines when necessary to reduce collection costs and put recycling on an economically viable basis.

Some government officials propose economic disincentives, such as New York City's proposed "packaging tax," that would force manufacturers to make their products easier to recycle or dispose of, or else drive them off the market, although such measures might be expensive and difficult for the government to administer fairly.

Legislative action is one eventual resolution to the problems of recycling. In 1970 the Solid Waste Disposal Act as amended by the Resource Recovery Act of 1970 made $463 million available over a three-year period to promote recycling. The act required the EPA to investigate many aspects of resource recovery, such as economic incentives and disincentives, packaging disposal charges, collection methods, changes in product characteristics, and the use of federal procurement. The EPA will issue its first progress report this summer and it may produce some new legislation. A number of bills have been introduced in the Congress regarding the recovery of wastepaper, but until the full results of the EPA's study appear, no action will be taken on them.

Fifth, newspapers must realize that they have an essential role to play in the future of recycling. They must study the situation in their areas, then educate their readers on what the individual and the local businessman can do to help solve environmental problems. If a reliable market for waste newsprint can be developed, all the advertising media should back the venture wholeheartedly.

Sixth, recycling centers should be set up—and conveniently located—in all major cities to act as dealers in recyclable materials.

Industry can do a great deal to increase the use of recycled materials by supporting research studies aimed at reducing solid waste pollution and should join local efforts to reclaim recyclable materials. Many more private firms should use stationery made of recycled paper.

Possibilities for recycling in Montana. In Montana, unfortunately, the possibilities for recycling old newspapers are severely limited. Montanans can best reduce the amount of newspapers in the solid waste stream by working toward the general recommendations cited above. But long-range planning is necessary to meet with the disposal problems of the future.

The establishment of municipal recycling centers is one important means of reducing a city's solid waste. Missoulians should be pleased that a city the size of Missoula has supported a recycling center.

Because Missoula's refuse is collected by private garbage collectors, it may be difficult to motivate residents to separate waste materials for collection and recycling. In the past, Missoulians have shown environmental consciousness in trying to keep Missoula's air pollution-free; thus, citywide support for waste disposal solutions could probably be engendered through education and public-spirited groups.

Garbage, to give it its rightful name, will continue to grow—in tonnage, and in disposal problems. The efforts of ordinary people worrying about pollution problems have had an enormous effect on both industry and government; surely if we put our best creative thoughts to work on ways to salvage and recycle our waste materials, solutions will be found.

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